

Supporting Information

Unveiling a PhSeSePh/I₂-Mediated Radical Cyclisation of 2-Alkynyl-N-alkyl-N-tosylanilines: Access to 3-Sulfonyl Indoles via 1,3 Tosyl-Relocation

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1) X-Ray Crystallographic Studies

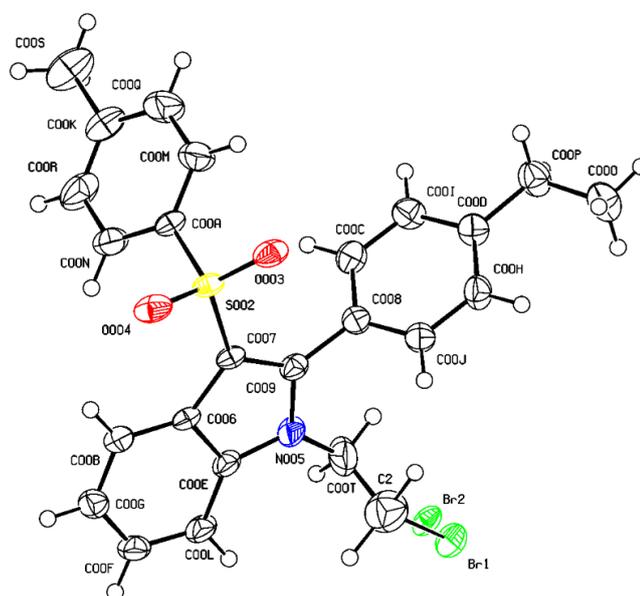


Figure S1. ORTEP diagram for each molecule of the asymmetric unit of compound **2c** drawn with 50% ellipsoid probability.

The crystals of **2c** of suitable quality were obtained from CHCl_3/n -hexane. The compound **2c** crystallized in Monoclinic crystal system with space group P 21/n. The single-crystal X-ray data were collected on an Oxford XCalibur CCD diffractometer using graphite monochromated Mo $K\alpha$ radiation. The structures was solved using SIR-92 and refined by full matrix least square technique on F^2 using the SHELXL-97¹⁻⁴ program within the WinGX v 1.80.05 software package. Atomic coordinates, bond lengths, bond angles, and thermal parameters for compounds **2c** has been deposited at the Cambridge Crystallographic Data Centre. CCDC deposit number for **2c** is 2495193.

Table S1. Crystallographic data and structure refinement for compounds 2c

Identification code	2c	
Empirical formula	$\text{C}_{25} \text{H}_{24} \text{Br} \text{N} \text{O}_2 \text{S}$	
Formula weight	482.42	
Temperature	168 K	
Wavelength	0.71073 Å	
Crystal system	Monoclinic	
Space group	P 21/n	
Unit cell dimensions	$a = 12.0627(6)$	$\alpha = 90$

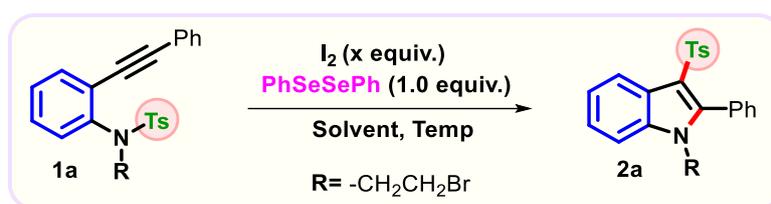
	b = 14.3169(7)	$\beta = 92.479(4)$
	c = 12.8459(7)	$\gamma = 90$
Volume	2216.4(2) Å ³	
Z	4	
Density (calculated)	1.446 g/cm ³	
Absorption coefficient	1.971 mm ⁻¹	
F(000)	992.0	
Index ranges	h= 16, k = 19, l = 18	
Reflections collected	0.0636(3869)	
Completeness to theta = 26.37 °	80 %	
Final R indices [I>2 sigma(I)] ^{a,b}	R1 = 0.0636, wR2 = 0.1812	

$$^a R = \sum(|F_o| - |F_c|) / \sum |F_o| ; ^b R_w = \{ \sum [w(F_o^2 - F_c^2)^2] / \sum [w(F_o^2)^2] \}^{1/2}$$

References:

1. CrysAlisPro, Agilent Technologies, Version 1.171.34.49, 2011.
2. Sheldrick, G. M., *Acta Cryst.* 2008, *A64*, 112.
3. Farrugia, L. J. WinGX Version 1.80.05, An integrated system of Windows Programs for the Solution, Refinement and Analysis of Single Crystal X-Ray Diffraction Data; Department of Chemistry, University of Glasgow, 1997-2009.
4. (a) Foresman, J. B.; Frisch, A. E. *Exploring Chemistry with Electronic Structure Methods*; Gaussian, Inc.: Pittsburgh, PA. 1995. (b) Hehre, W. J., Radom, L., Schleyer, P. V. R.; Pople, J. A. *Ab Initio Molecular Orbital Theory*; Wiley: New York, 1985.

OPTIMIZATION OF REACTION CONDITION



entry	reagent (equiv.)	solvent	temp/time (°C)/(h)	Yield ^b (%) 2a
1 ^c	I ₂ (1.0)	Toluene	110/24	20
2	I₂ (1.0)	Toluene	110/2	70
3	I ₂ (2.0)	Toluene	110/2	65
4 ^d	I ₂ (1.0)	Toluene	110/2	68
5 ^e	I ₂ (1.0)	Toluene	110/2	35
6	I ₂ (1.0)	DMF	110/2	N.R.
7	I ₂ (1.0)	DMSO	110/2	N.R.
8	I ₂ (1.0)	Benzene	110/2	55
9	I ₂ (1.0)	Xylene	110/2	60
10	I ₂ (1.0)	CH ₃ CN	110/2	Trace
11	I ₂ (1.0)	Toluene	130/2	40
12	I ₂ (1.0)	Toluene	100/2	60
13	I ₂ (1.0)	Toluene	80/2	40
14	ICl (1.0)	Toluene	110/2	Trace

Table 1. Optimisation of Reaction Conditions^{a,b}. Reactions were performed using 0.1 mmol of **1a**, 1.0 equiv. iodine and 1.0 equiv. of PhSeSePh in 4.0 mL solvent at 110°C, unless otherwise noted. ^bIsolated yield. ^cwithout PhSeSePh, ^d2.0 equiv. of PhSeSePh. ^e0.5 equiv. of PhSeSePh.

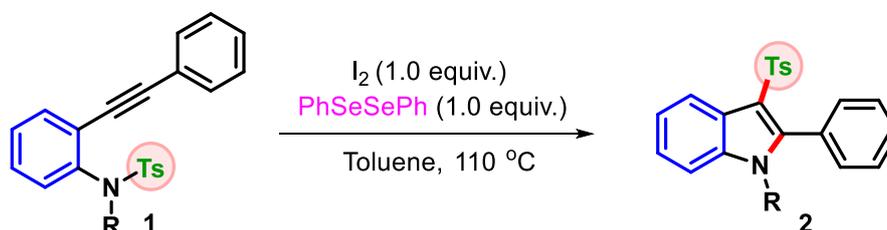
We began our investigation using N-(2-bromoethyl)-4-methyl-N-(2-(phenylethynyl)phenylbenzenesulfonamide) **1a** as a model substrate (Table 1). Reaction of **1a** (0.1 mmol) with 1.0 equiv of iodine in toluene at 110°C for 24 h, provided the desired product **2a** in 20% yield (entry 1). Addition of 1.0 equiv. of diphenyldiselenide provided product **2a** in 70% yield within 2.0 h (entry 2). Increasing the equivalents of iodine did not improve the yield of the product (entry 3). The yield of the product **2a** remained almost the same upon increasing the loading of diphenyldiselenide from 1 to 2 equiv. (entry 4). However, lowering the amount of diphenyldiselenide from 1.0 equiv to 0.5 equiv significantly affected the yield of the product and afforded the product **2a** only in 35% yield (entry 5). Next, we screened different solvents such as DMF, DMSO, benzene etc. (entries 6–10); toluene was found to be the most suitable for the reaction. Increase of the reaction temperature to 130 °C adversely affected the yield, as product **2a** was obtained in 40% yield (entry 11). Lowering the reaction temperature diminished the yield of **2a** to 60% (at 100°C) and 40% (at 80°C), respectively (entries 12-13). Use

of ICl failed to provide the desired product (entry 14). The structure of product **2** was confirmed by an X-ray crystallographic analysis of compound **2c** (Scheme 2).

General Experimental Procedure:

^1H NMR (400 MHz) and ^{13}C NMR (100 MHz) spectra were recorded in $\text{CDCl}_3/\text{DMSO-d}_6$. Chemical shifts for protons and carbons are reported in ppm from tetramethylsilane and are referenced to the carbon resonance of the solvent. Data are reported as follows: chemical shift, multiplicity (s = singlet, d = doublet, t = triplet, q = quartet, m = multiplet, dd = doublet of doublet), coupling constants in Hertz and integration. High-resolution mass spectra were recorded on an electrospray mass spectrometer. Crystal structure analysis was accomplished on a single-needle X-ray diffractometer. TLC analysis was performed on commercially prepared 60 F254 silica gel plates and visualised by either UV irradiation or by staining with iodine. All purchased chemicals were used as received. All melting points are uncorrected. UV-visible spectra were recorded on a Lab India Analytical UV 3092 Spectrophotometer. Fluorescence was recorded on a Hitachi F-4700 fluorescence spectrophotometer.

2. General Procedure for the Synthesis of 1-(2-bromoethyl)-2-phenyl-3-tosyl-1H-indole (2a-p; 4a-g; 6a-e; 8a-e).

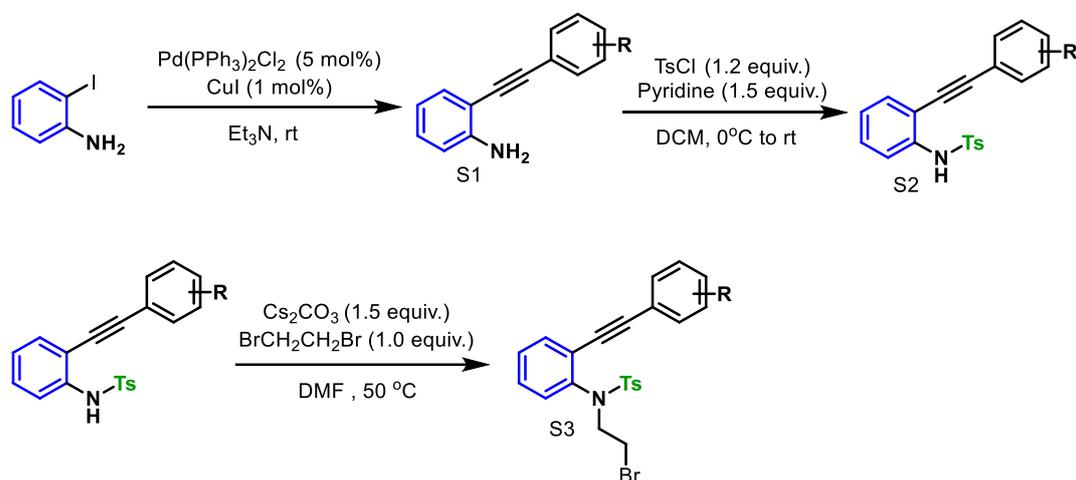


A 50 mL flask charged with the corresponding **1** (0.1 mmol, 1.0 equiv.), PhSeSePh (1.0 equiv.), and I_2 (1.0 equiv.) in 2ml of toluene, and the resulting mixture was stirred at $100\text{ }^\circ\text{C}$ for 2 h. After the consumption of the starting material, the reaction mixture was washed with brine, extracted with ethyl acetate, and evaporated. The residue was purified by column chromatography (hexane/ethyl acetate) (90/10) to afford the corresponding coupled products.

3. General procedure for the synthesis of starting materials (1a-p; 3a-g; 5a-e; 7a-e):

A. General Procedure for the Synthesis of N-(bromoethane)-N-tosyl-2-(arylethynyl)aniline (1a-p;

3a-g; 5a-e):



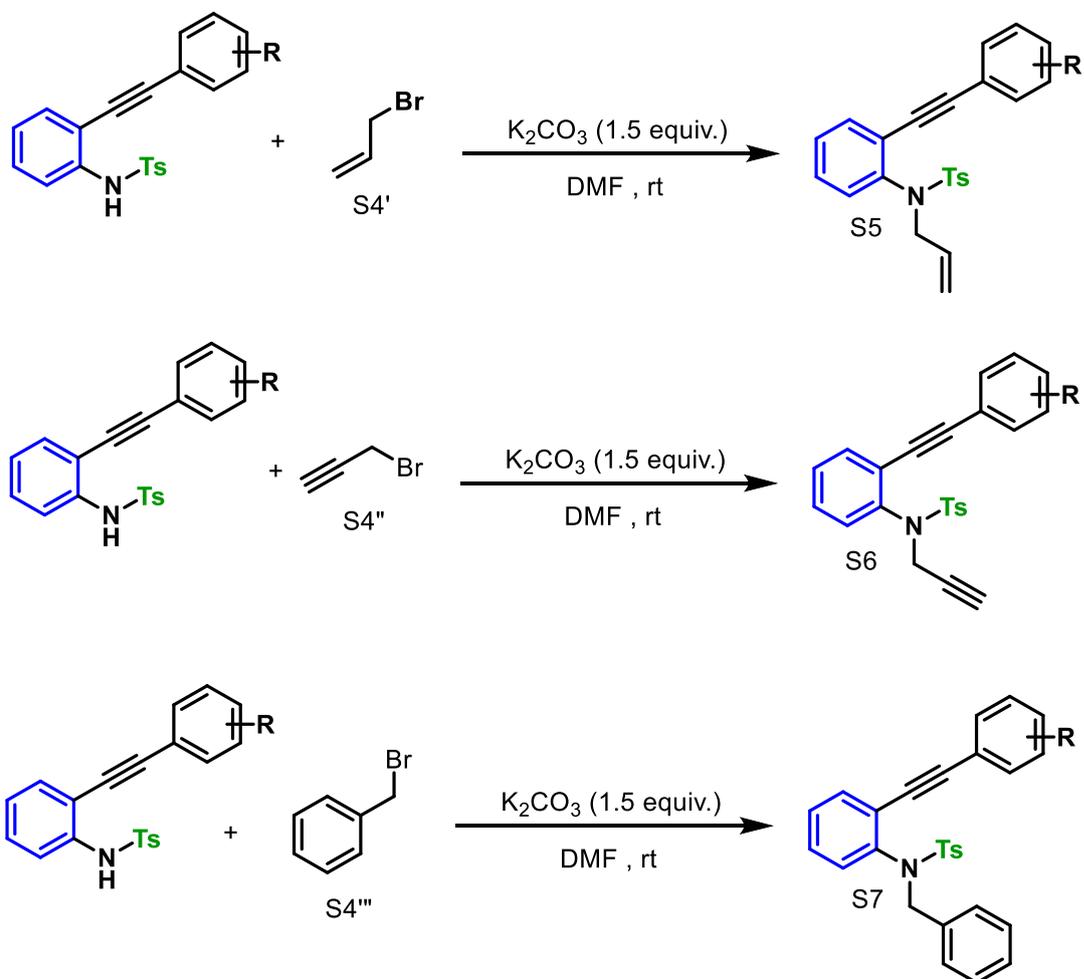
Step 1: A 50 mL round-bottom flask charged with the corresponding aniline (2 mmol, 1.0 equiv.), Pd(PPh₃)₂Cl₂ (5 mol%), and CuI (1 mol%) in degassed Et₃N (5 mL), and then terminal alkynes (2 mmol, 1.0 equiv.) were added, and the resulting mixture was stirred at room temperature for 6 h. Upon completion, the solvent was removed under reduced pressure, and the residue was extracted with EtOAc (3 x 15 mL). The combined organic layer was dried over Na₂SO₄ and concentrated. The resulting residue was purified by flash silica gel column chromatography (hexane/ethyl acetate) (99/1) to afford the desired products S1.

Step 2: To a stirred solution of S1 (2 mmol, 1.0 equiv) in DCM (15 mL), pyridine (2 mmol, 1.5 equiv) was added and stirred at 0°C. Afterwards, TsCl (0.1, 1.5 equiv) was added to the reaction mixture. Then, the resulting mixture was stirred at room temperature for 12 h. The reaction mixture was diluted with brine solution, and finally extracted with DCM (3 x 15 mL). The combined organic layer was dried over Na₂SO₄ and concentrated. The resulting residue was purified by flash silica gel column chromatography (hexane/ethyl acetate) (95/5) to afford the desired products S2.

Step 3: In an oven-dried 25 mL round-bottom flask, S2 (2 mmol, 1.0 equiv), Cs₂CO₃ (0.1, 1.5 equiv), and 1,2-dibromoethane (2 mmol, 1.0 equiv) were added in DMF (15 mL). The resulting reaction mixture was stirred at 50 °C for 2h. The reaction mixture was allowed to cool, diluted with brine solution, and

finally extracted with EtOAc (2×10 mL). The combined organic layers were dried over Na_2SO_4 , concentrated under vacuum, and purified by column chromatography (hexane/ethyl acetate) (95/5) using 100–200 mesh size silica gel to afford the corresponding products.

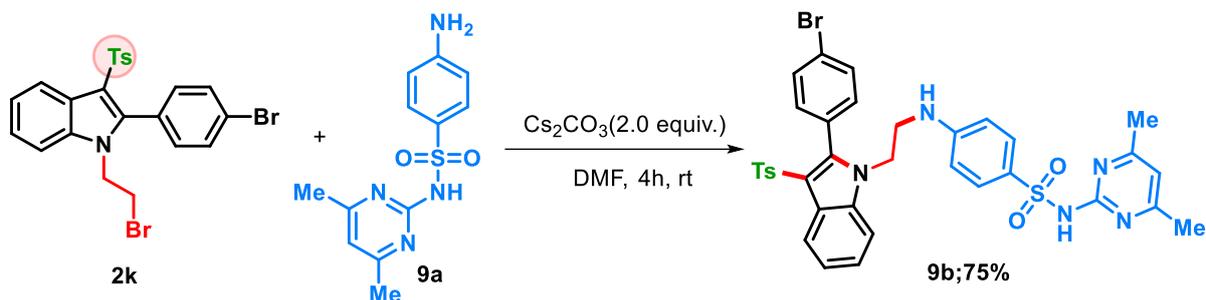
B. General Procedure for the Synthesis of the Starting Substrates (7a-e):



6

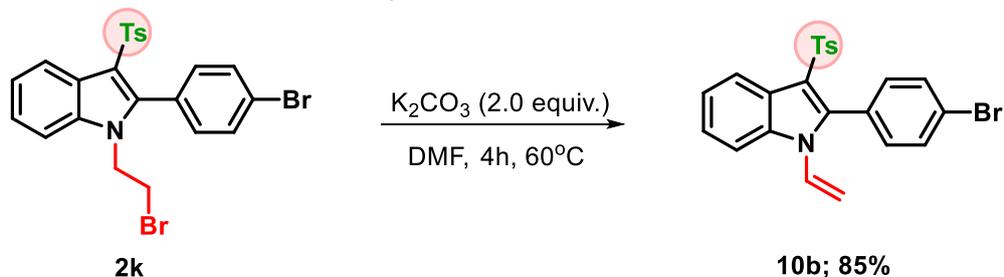
In an oven-dried 25 mL round-bottom flask N-tosylalkynylaniline (2.0 mmol, 1.0 equiv) in DMF, K_2CO_3 (2.0 mmol, 1.5 equiv) was added. Then S4 (4.0 mmol, 2.0 equiv) was added to the reaction mixture and stirred at room temperature until TLC revealed a complete conversion of the starting material. The reaction mixture was diluted with brine solution, and finally extracted with EtOAc (2×10 mL). The combined organic layers were dried over Na_2SO_4 , concentrated under vacuum, and purified by column chromatography(hexane/ethyl acetate) (95/5) using 100–200 mesh size silica gel to afford the corresponding product (S5, S6, S7).

5. General Procedure for the Synthesis of 9b:



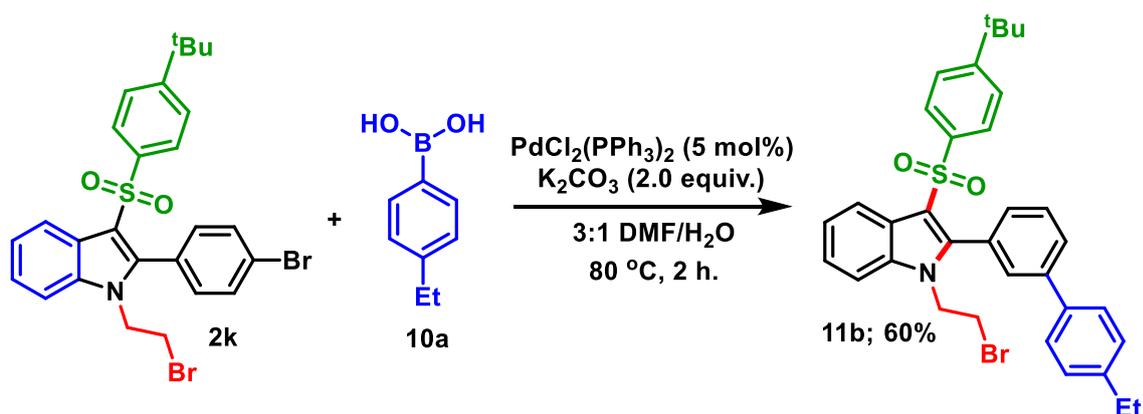
In an oven-dried 25 mL round-bottom flask, 2k (0.1 mmol, 1.0 equiv.) was taken, and sulphonamide (0.1 mmol, 1.2 equiv.), Cs_2CO_3 (0.2 mmol, 2.0 equiv.) were added in 2 mL of DMF. The reaction mixture was heated at 60 °C for 4h. The progress of the reaction was monitored with TLC. After the consumption of the starting material, the reaction mixture was washed with brine, extracted with ethyl acetate, and evaporated. The residue was purified by column chromatography (hexane/ethyl acetate) (95/5) to afford the product 9b.

6. General Procedure for the Synthesis of 10b:



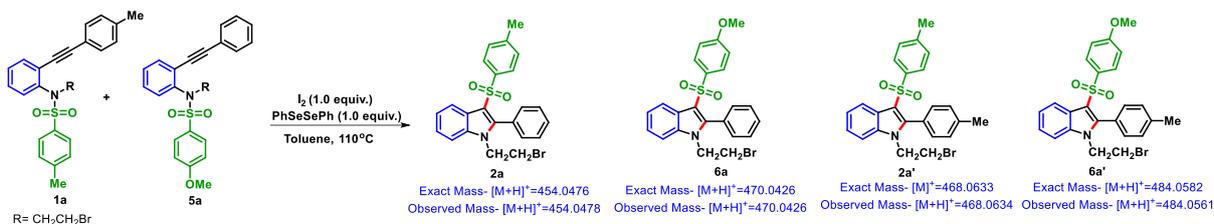
In an oven-dried 25 mL round-bottom flask, 2k (0.1 mmol, 1.0 equiv.) was taken, and K_2CO_3 (0.2 mmol, 2.0 equiv) was added in 2 mL of DMF. The reaction mixture was heated at 60 °C for 4h. The progress of the reaction was monitored with TLC. After the consumption of the starting material, the reaction mixture was washed with brine, extracted with ethyl acetate, and evaporated. The residue was purified by column chromatography (hexane/ethyl acetate) (95/5) to afford the product 10b.

7. General Procedure for the Synthesis of 9b:



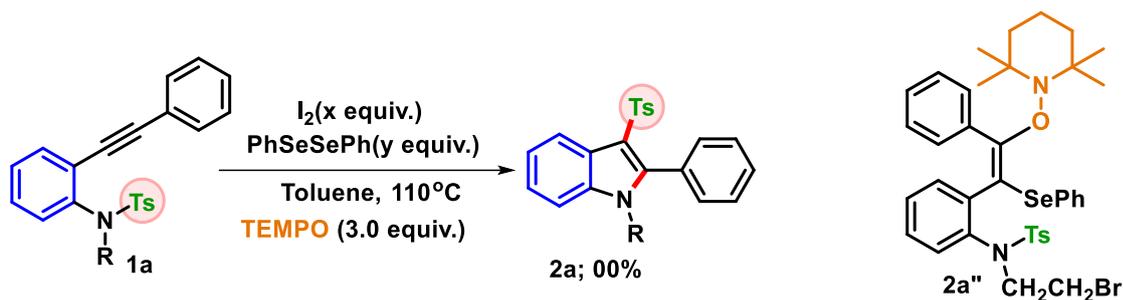
In an oven-dried 25 mL round-bottom flask, 2k (0.1 mmol, 1.0 mmol) was taken, and aryl boronic acid (0.1 mmol, 1.2 equiv), Pd(PPh₃)₄ (5 mol%) and K₂CO₃ (0.2 mmol, 2.0 equiv) were added in a 3:1 mixture of DMF/H₂O. The reaction mixture was then purged with nitrogen and stirred at 80 °C for 2 h. The progress of the reaction was monitored with TLC. After the consumption of the starting material, the reaction mixture was washed with brine, extracted with ethyl acetate, and evaporated. The residue was purified by column chromatography (hexane/ethyl acetate) (98/10) to afford the corresponding coupled products.

8. General Procedure for the Control Experiments:



In an oven-dried 25 mL round-bottom flask, 1a (0.01 mmol, 1.0 equiv.), 5a (0.01 mmol, 1.0 equiv.), I₂ (2.0 equiv.), PhSeSePh (2.0 equiv.), were added in 2 mL of toluene. The reaction mixture was stirred at 110 °C for 2h. The progress of the reaction was monitored with TLC. The formation of the cross products was confirmed by HRMS.

9. General Procedure for the reaction of 2a in TEMPO:



Exact Mass- $[\text{M}+\text{H}]^+=761.1475$
Observed Mass- $[\text{M}+\text{H}]^+=761.1534$

In an oven-dried 25 mL round-bottom flask, 1a (0.1 mmol, 1.0 equiv.), 5a (0.1 mmol, 1.0 equiv.), I₂ (2.0 equiv.), PhSeSePh (2.0 equiv.), and TEMPO (3.0 equiv.) were added in 2 mL of toluene. The reaction mixture was stirred at 110 °C for 2 hours. TLC analysis of the crude reaction showed that 2a was not formed. The formation of a TEMPO adduct with intermediate A was confirmed by HRMS.

10. UV-Spectra and Fluorescence Spectra:

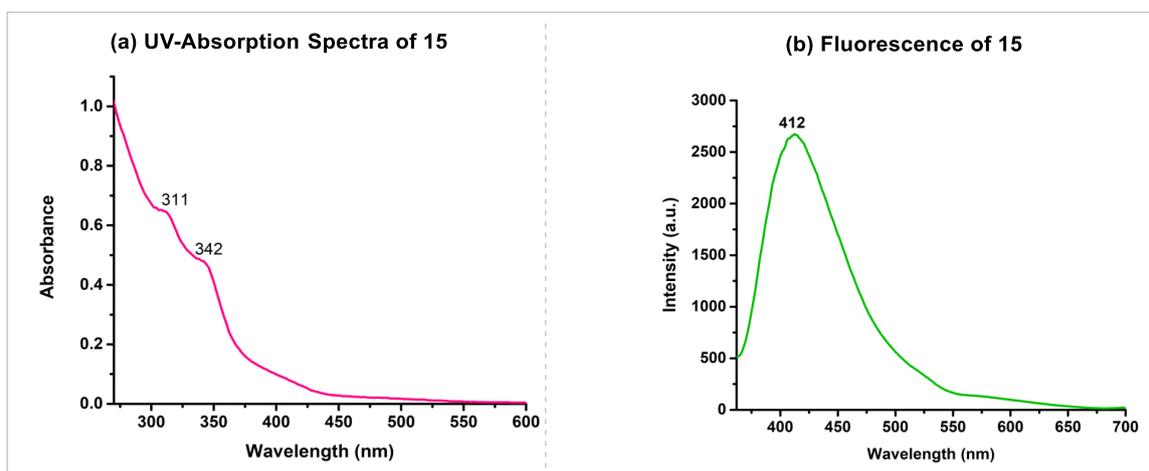
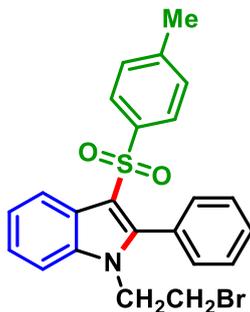


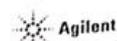
Figure 1. (a) UV-Spectra of 15 in CHCl₃ and (b) Fluorescence spectra of 15 in CHCl₃.

HRMS



2a

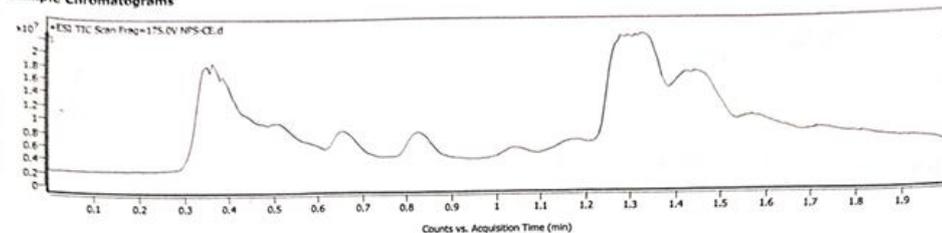
Compound Screening Report



Sample Information

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Inj Vol (µl)	3	IRM Status	Success
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Acq Operator	SYSTEM (SYSTEM)	Result Summary	1 qualified (1 targets)

Sample Chromatograms



Compound Summary

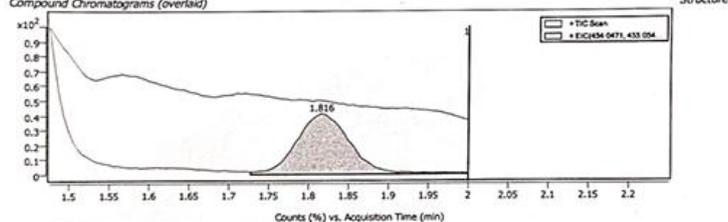
Cpd Name	Formula	CAS	RT	Mass	Mass [Tgt]	Diff [Tgt, ppm]	Score	Algorithm
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Compound Details

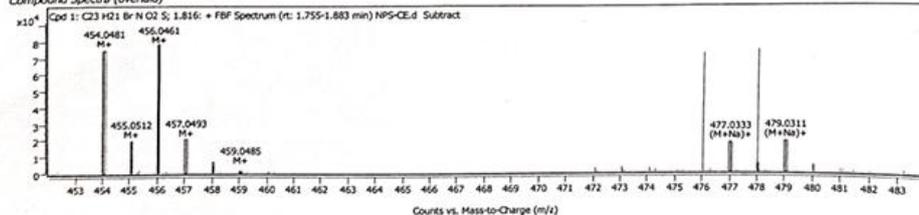
Cpd 1: C23 H21 Br N O2 S

Name	Formula	RT	RI	Mass	Diff [Tgt, ppm]	CAS	ID Source	Score	Algorithm
	C23 H21 Br N O2 S	1.816		454.0478	0.46		FBF	97.42	FBF
Species	m/z	Score [Tgt]	Score [Lib]	Score [DB]	Score [MFG]	Score [RT]			
M+ (M+Na)+	454.0481, 477.0333	97.42							

Compound Chromatograms (overlay)



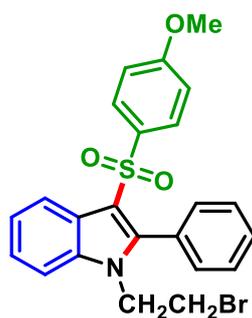
Compound Spectra (overlay)



Compound ID Table

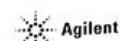
Name	Formula	Species	RT	RT Diff	Mass	CAS	ID Source	Score	Score [Lib]	Score [Tgt]
	C23 H21 Br N O2 S	M+ (M+Na)+	1.816		454.0478		FBF	97.42		97.42

HRMS



6a

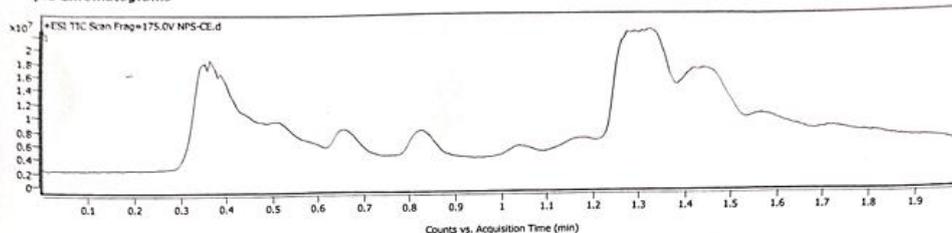
Compound Screening Report



Sample Information

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Plate Position		Target Source Path	
Acq Operator	SYSTEM (SYSTEM)	Result Summary	1 qualified (1 targets)

Sample Chromatograms



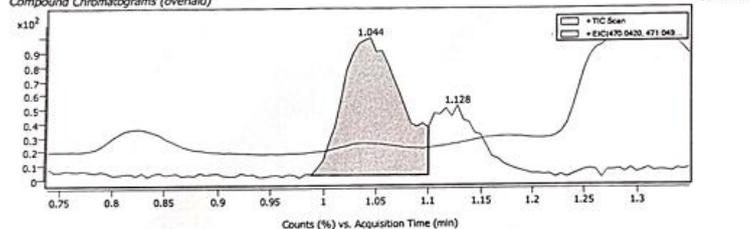
Compound Summary

Cpd Name	Formula	CAS	RT	Mass	Mass (Tgt)	Diff (Tgt, ppm)	Score	Algorithm
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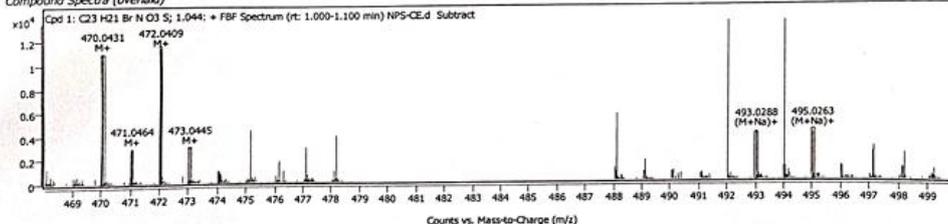
Compound Details

Cpd 1: C23 H21 Br N O3 S									
Name	Formula	RT	RI	Mass	Diff (Tgt, ppm)	CAS	ID Source	Score	Algorithm
	C23 H21 Br N O3 S	1.044		470.0426	0.10		FBF	97.45	FBF
Species	m/z	Score (Tgt)	Score (Lib)	Score (DB)	Score (MFG)	Score (RT)			
M+ (M+Na)+	470.0431 493.0288	97.45							

Compound Chromatograms (overlaid)



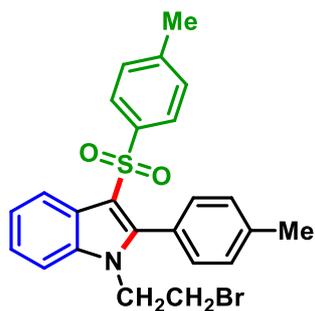
Compound Spectra (overlaid)



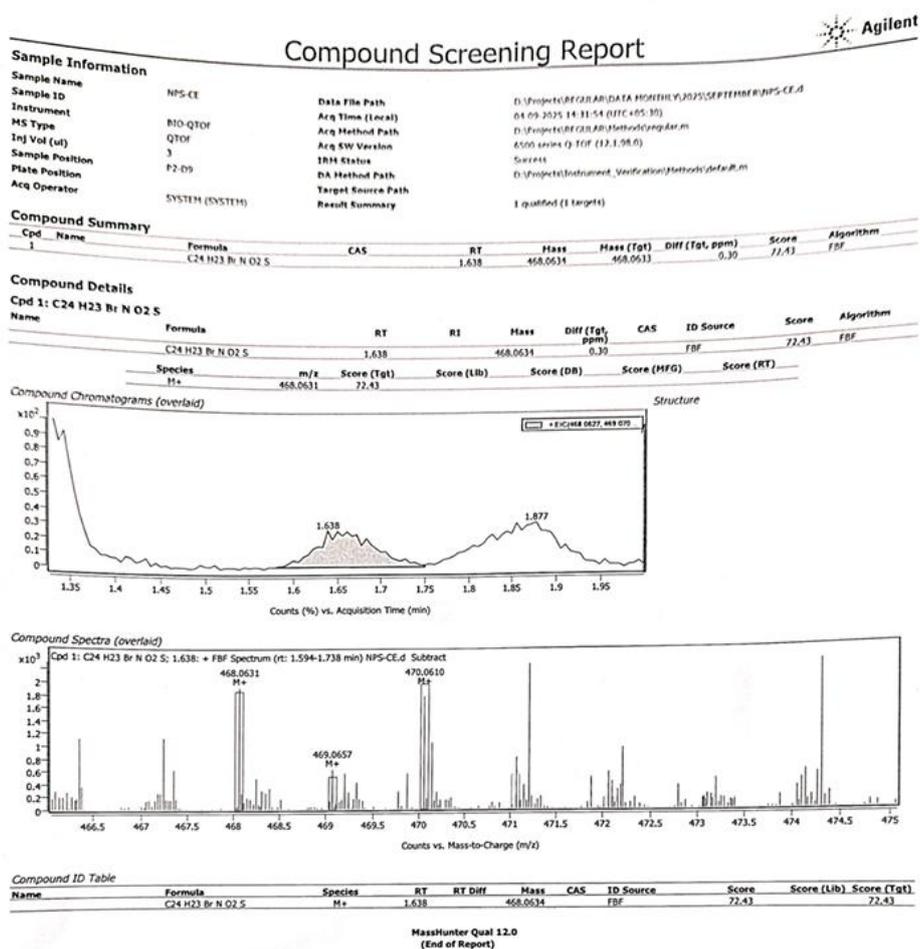
Compound ID Table

Name	Formula	Species	RT	RT Diff	Mass	CAS	ID Source	Score	Score (Lib)	Score (Tgt)
	C23 H21 Br N O3 S	M+ (M+Na)+	1.044		470.0426		FBF	97.45		97.45

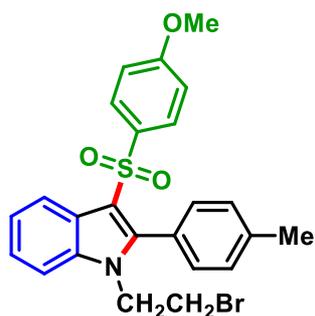
HRMS



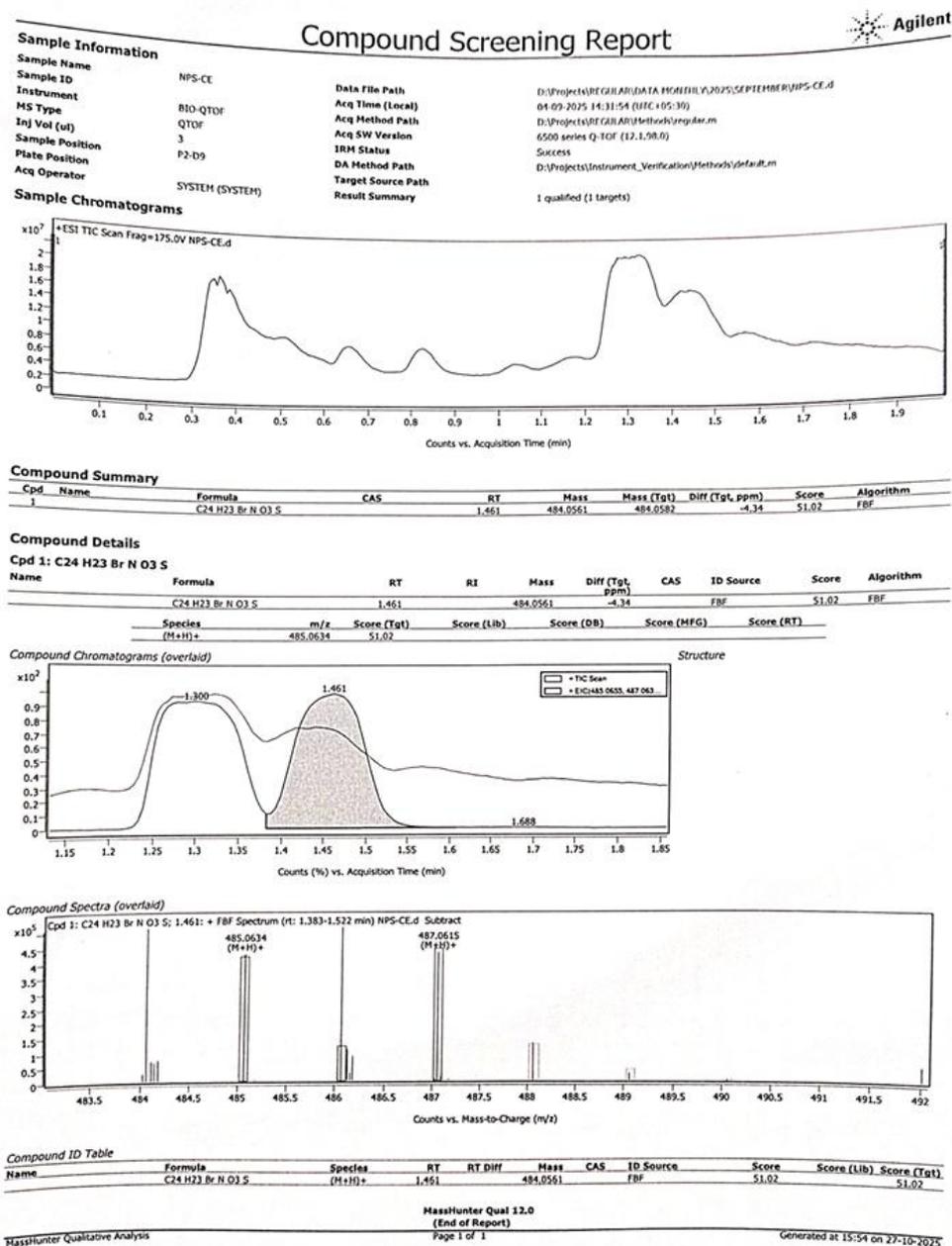
2a'



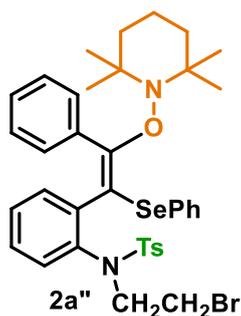
HRMS



6a'



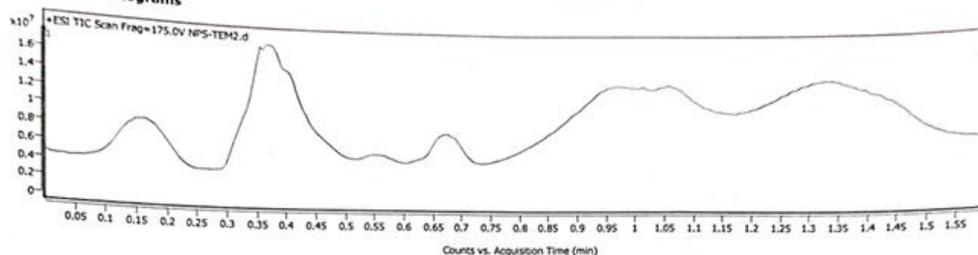
HRMS



Compound Screening Report Agilent

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MS Type	QTOF	IRM Status	Success
Inj Vol (ul)	2	DA Method Path	D:\Projects\Instrument_Verification\Method\default.m
Sample Position	2	Target Source Path	
Plate Position	P1-C2	Result Summary	1 qualified (1 targets)
Acq Operator	SYSTEM (SYSTEM)		

Sample Chromatograms



Compound Summary

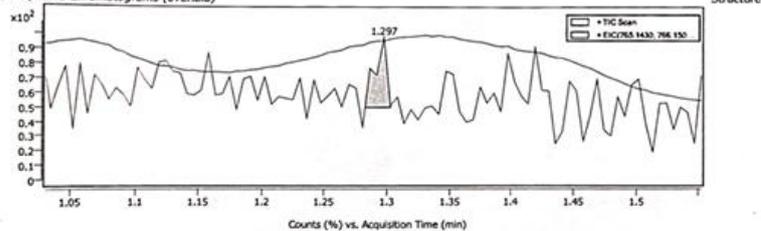
Cpd	Name	Formula	CAS	RT	Mass	Mass (Tot)	Diff (Tot, ppm)	Score	Algorithm
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Compound Details

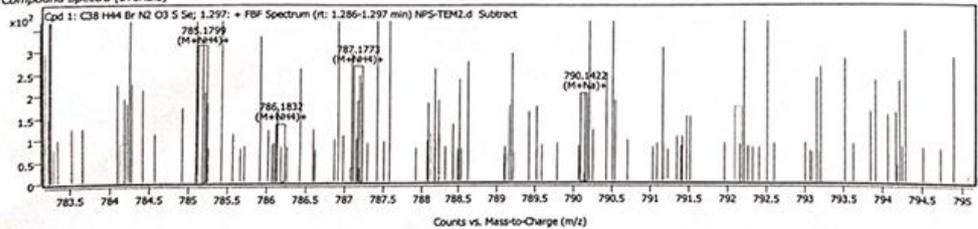
Cpd 1: C₃₈H₄₄BrN₂O₃Se

Name	Formula	RT	RI	Mass	Diff (Tot, ppm)	CAS	ID Source	Score	Algorithm
	C ₃₈ H ₄₄ BrN ₂ O ₃ Se	1.297		761.1534	7.03		FBF	59.27	FBF

Compound Chromatograms (overlaid)



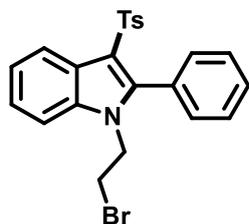
Compound Spectra (overlaid)



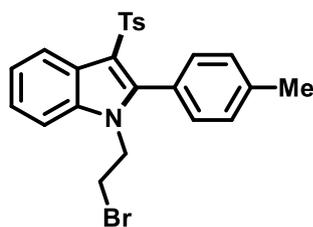
Compound ID Table

Name	Formula	Species	RT	RT Diff	Mass	CAS	ID Source	Score	Score (Lib)	Score (Tot)
	C ₃₈ H ₄₄ BrN ₂ O ₃ Se	(M+14)+ (M+214)+	1.297		761.1534		FBF	59.27		59.27

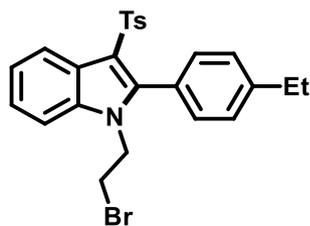
Characterisation Data for the Products:



1-(2-bromoethyl)-2-phenyl-3-tosyl-1H-indole (2a). The product was obtained as a white solid (31.78 mg, 70%): m.p 155-157 °C: ¹H-NMR (400 MHz, CDCl₃) δ 8.29-8.25 (m, 1H), 7.51-7.47 (m, 1H), 7.44-7.41 (m, 4H), 7.32-7.27 (m, 3H), 7.23-7.21 (m, 2H), 7.03 (d, J = 8.0 Hz, 2H), 4.19 (t, J = 7.6 Hz, 2H), 3.27 (t, J = 7.6 Hz, 2H), 2.25 (s, 3H); ¹³C{¹H} NMR (100 MHz, CDCl₃) δ 143.4, 143.0, 140.9, 135.1, 134.8, 130.7, 130.0, 129.6, 129.4, 129.2, 128.6, 128.3, 128.0, 127.4, 126.6, 125.0, 124.0, 123.0, 121.1, 109.8, 45.4, 29.5, 27.4; HRMS (ESI) [M+H]⁺ Calcd for [C₂₃H₂₁BrNO₂S] 454.0476, found 454.0478.

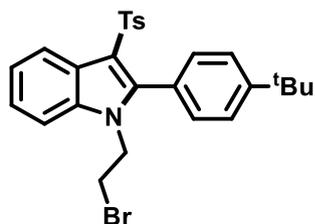


1-(2-bromoethyl)-2-(p-tolyl)-3-tosyl-1H-indole (2b). The product was obtained as a white solid (33.7 mg, 72%): mp 158-160 °C: ¹H-NMR (400 MHz, CDCl₃) δ 8.26-8.23 (m, 1H), 7.44 (d, J = 8.2 Hz, 2H), 7.31-7.21 (m, 5H), 7.10 (d, J = 8.0 Hz, 2H), 7.03 (d, J = 8.1 Hz, 2H), 4.18 (t, J = 7.7 Hz, 2H), 3.26 (t, J = 7.7 Hz, 2H), 2.40 (s, 3H), 2.24 (s, 3H); ¹³C{¹H} NMR (100 MHz, CDCl₃) δ 142.8, 142.0, 140.0, 139.1, 134.1, 129.5, 128.2, 128.0, 125.6, 124.5, 124.0, 122.9, 121.9, 120.0, 113.9, 108.8, 44.1, 26.5, 20.6, 20.4; HRMS (ESI) [M]⁺ Calcd for [C₂₄H₂₂BrNO₂S] 468.0633, found 468.0634.



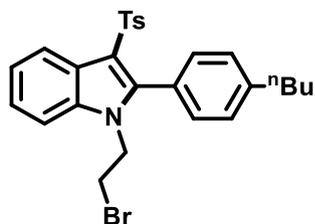
1-(2-bromoethyl)-2-(4-ethylphenyl)-3-tosyl-1H-indole (2c). The product was obtained as a brown solid (36.1 mg, 75%): mp 160-162 °C: ¹H-NMR (400 MHz, CDCl₃) δ 8.28-8.24

(m, 1H), 7.42 (dd, $J = 6.7, 1.6$ Hz, 2H), 7.32-7.23 (m, 5H), 7.12 (dd, $J = 6.4, 1.7$ Hz, 2H), 7.02 (d, $J = 8.0$ Hz, 2H), 4.21-4.17 (m, 2H), 3.27 (t, $J = 7.7$ Hz, 2H), 2.71 (q, $J = 7.6$ Hz, 2H), 2.25 (s, 3H), 1.27 (t, $J = 7.6$ Hz, 3H); $^{13}\text{C}\{^1\text{H}\}$ NMR (100 MHz, CDCl_3) δ 146.2, 143.7, 142.9, 140.9, 135.0, 130.6, 129.2, 127.8, 126.7, 125.6, 125.1, 123.8, 122.9, 121.1, 109.8, 45.1, 28.8, 27.5, 21.4, 15.2; HRMS (ESI) $[\text{M}+\text{H}]^+$ Calcd for $[\text{C}_{25}\text{H}_{25}\text{BrNO}_2\text{S}]$, 482.0789 found 482.0791.



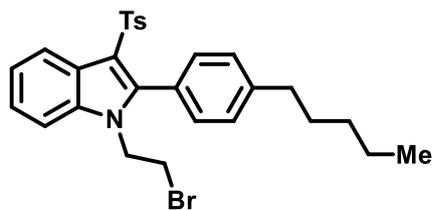
1-(2-bromoethyl)-2-(4-(tert-butylphenyl))-3-tosyl-1H-indole (2d). The

product was obtained as a brown solid (37.2 mg, 73%): mp 168-170 °C; ^1H -NMR (400 MHz, CDCl_3) δ 8.27 (q, $J = 3.1$ Hz, 1H), 7.39 (d, $J = 8.4$ Hz, 2H), 7.35 (d, $J = 8.2$ Hz, 2H), 7.30-7.24 (m, 3H), 7.10 (dd, $J = 6.6, 1.8$ Hz, 2H), 6.97 (d, $J = 8.1$ Hz, 2H), 4.19 (t, $J = 7.6$ Hz, 2H), 3.27 (t, $J = 7.6$ Hz, 2H), 2.23 (s, 3H), 1.33 (s, 9H); ^{13}C -NMR (100 MHz, CDCl_3) δ 153.0, 143.6, 142.8, 140.7, 134.9, 130.4, 130.2, 129.0, 126.9, 126.6, 125.3, 125.2, 125.1, 123.7, 122.8, 121.1, 115.0, 109.8, 45.1, 34.8, 31.3, 27.6, 21.4; HRMS (ESI) $[\text{M}+\text{H}]^+$ Calcd for $[\text{C}_{27}\text{H}_{29}\text{BrNO}_2\text{S}]$ 510.1102, found 510.1098.



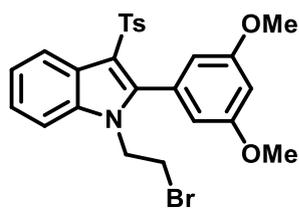
1-(2-bromoethyl)-2-(4-butylphenyl)-3-tosyl-1H-indole (2e). The product

was obtained as a brown solid (36.7 mg, 72%): mp 162-164 °C: ^1H -NMR (400 MHz, CDCl_3) δ 8.27-8.23 (m, 1H), 7.38 (d, $J = 8.2$ Hz, 2H), 7.29-7.23 (m, 3H), 7.20 (d, $J = 8.0$ Hz, 2H), 7.08 (d, $J = 8.0$ Hz, 2H), 6.98 (d, $J = 8.1$ Hz, 2H), 4.17 (t, $J = 7.6$ Hz, 2H), 3.24 (t, $J = 7.6$ Hz, 2H), 2.64 (t, $J = 7.8$ Hz, 2H), 2.21 (s, 3H), 1.65-1.58 (m, 2H), 1.35 (td, $J = 14.9, 7.4$ Hz, 2H), 0.90 (t, $J = 7.4$ Hz, 3H); ^{13}C -NMR (100 MHz, CDCl_3) δ 145.0, 143.8, 142.9, 140.9, 135.0, 130.6, 129.1, 128.3, 126.6, 125.6, 125.1, 123.8, 122.8, 121.1, 115.0, 109.8, 45.1, 35.6, 33.3, 27.5, 22.4, 21.4, 14.0; HRMS (ESI) $[\text{M}+\text{H}]^+$ Calcd for $[\text{C}_{27}\text{H}_{29}\text{BrNO}_2\text{S}]$, 510.1102 found 510.1123.



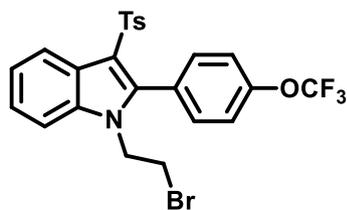
1-(2-bromoethyl)-2-(4-pentylphenyl)-3-tosyl-1H-indole (2f). The

product was obtained as a white solid (38.7 mg, 74%): mp 160-162°C: $^1\text{H-NMR}$ (400 MHz, CDCl_3) δ 8.28-8.25 (m, 1H), 7.39 (d, $J = 8.2$ Hz, 2H), 7.30-7.25 (m, 3H), 7.21 (d, $J = 8.0$ Hz, 2H), 7.09 (d, $J = 8.0$ Hz, 2H), 6.99 (d, $J = 8.0$ Hz, 2H), 4.18 (t, $J = 7.6$ Hz, 2H), 3.25 (t, $J = 7.6$ Hz, 2H), 2.64 (t, $J = 7.8$ Hz, 2H), 2.23 (s, 3H), 1.65-1.62 (m, 2H), 1.32 (t, $J = 3.5$ Hz, 4H), 0.86 (t, $J = 6.5$ Hz, 3H); $^{13}\text{C-NMR}$ (100 MHz, CDCl_3) δ 145.0, 143.7, 142.9, 140.9, 135.0, 130.5, 129.1, 128.3, 126.6, 125.6, 125.1, 123.8, 122.8, 121.0, 115.0, 109.8, 45.1, 35.8, 31.5, 30.8, 27.5, 22.5, 21.4, 14.0; HRMS (ESI) $[\text{M}+\text{H}]^+$ Calcd for $[\text{C}_{28}\text{H}_{31}\text{BrNO}_2\text{S}]$ 524.1259, found 524.1295.



1-(2-bromoethyl)-2-(3,5-dimethoxyphenyl)-3-tosyl-1H-indole(2g). The

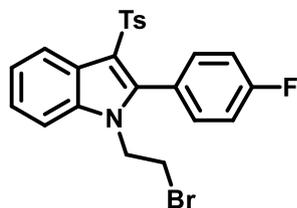
product was obtained as a white solid (39.1 mg, 76%): mp 150-152 °C: $^1\text{H-NMR}$ (400 MHz, CDCl_3) δ 1H-NMR (400 MHz, CHLOROFORM-D) δ 8.27-8.24 (m, 1H), 7.47 (d, $J = 8.2$ Hz, 2H), 7.31-7.24 (m, 3H), 7.02 (d, $J = 8.0$ Hz, 2H), 6.52 (s, 1H), 6.29 (s, 2H), 4.21 (t, $J = 7.5$ Hz, 2H), 3.69 (s, 6H), 3.30 (t, $J = 7.6$ Hz, 2H), 2.23 (s, 3H); $^{13}\text{C}\{^1\text{H}\}$ NMR (100 MHz, CDCl_3) δ 13C-NMR (101 MHz, CHLOROFORM-D) δ 160.4, 143.0, 140.8, 135.0, 130.2, 129.6, 129.1, 127.3, 126.7, 125.0, 123.9, 122.9, 121.1, 114.9, 109.9, 108.8, 107.5, 102.0, 55.4, 45.2, 27.7, 21.4; HRMS (ESI) $[\text{M}+\text{H}]^+$ Calcd for $[\text{C}_{25}\text{H}_{25}\text{BrNO}_4\text{S}]$ 514.0688, found 514.0721.



1-(2-bromoethyl)-3-tosyl-2-(4-(trifluoromethoxyphenyl)-1H-indole (2h).

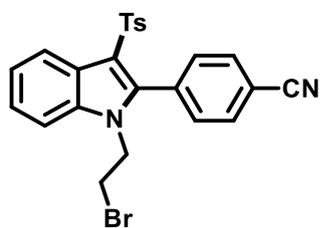
The product was obtained as a white (34.9 mg, 65%): mp 180-182 °C: $^1\text{H-NMR}$ (400 MHz, CDCl_3) δ 8.29-8.25 (m, 1H), 7.37 (d, $J = 8.3$ Hz, 2H), 7.30 (q, $J = 3.0$ Hz, 3H), 7.25 (s, 4H), 7.01 (d, $J = 8.0$ Hz,

2H), 4.20 (t, $J = 7.4$ Hz, 2H), 3.30 (t, $J = 7.4$ Hz, 2H), 2.24 (s, 3H); $^{13}\text{C}\{^1\text{H}\}$ NMR (100 MHz, CDCl_3) 149.4, 142.3, 140.7, 139.7, 134.1, 131.7, 128.3, 126.1, 125.6, 124.1, 123.3, 122.1, 120.2, 119.4, 114.8, 109.0, 44.2, 26.5, 20.4; HRMS (ESI) $[\text{M}+\text{H}]^+$ Calcd for $[\text{C}_{24}\text{H}_{20}\text{BrF}_3\text{NO}_3\text{S}]$, 538.0299, found 538.0279.



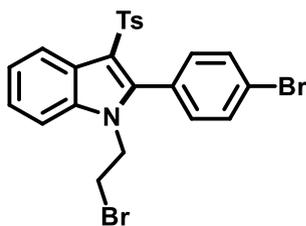
1-(2-bromoethyl)-2-(4-fluorophenyl)-3-tosyl-1H-indole (2i). The product was

obtained as a solid (32.1 mg, 68%): mp 160-162 °C: ^1H -NMR (400 MHz, CDCl_3) δ 8.25 (qd, $J = 2.9$, 1.1 Hz, 1H), 7.41 (d, $J = 8.3$ Hz, 2H), 7.29 (t, $J = 3.0$ Hz, 3H), 7.23-7.20 (m, 2H), 7.14-7.09 (m, 2H), 7.04 (d, $J = 8.0$ Hz, 2H), 4.19 (t, $J = 7.5$ Hz, 2H), 3.28 (t, $J = 7.5$ Hz, 2H), 2.25 (s, 3H); $^{13}\text{C}\{^1\text{H}\}$ NMR (100 MHz, CDCl_3) δ 160 ($J_{\text{C-F}} = 313\text{Hz}$), 158.6, 158.4, 143.2, 142.3, 140.8, 135.0, 132.9 ($J_{\text{C-F}} = 7.7\text{Hz}$), 129.3, 126.6, 125.0, 124.5, 124.1, 123.1, 121.2, 115.6 ($J_{\text{C-F}} = 21.6$ Hz), 109.9, 45.1, 27.4, 21.5; HRMS (ESI) $[\text{M}+\text{H}]^+$ Calcd for $[\text{C}_{23}\text{H}_{20}\text{BrFNO}_2\text{S}]$, 472.0382, found 472.0375.

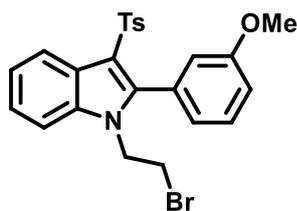


4-(1-(2-bromoethyl)-3-tosyl-1H-indol-2-yl)benzonitrile (2j). The product

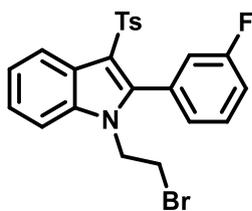
was obtained as a white solid (34.7 mg, 64%): mp 150-152 °C: ^1H -NMR (400 MHz, CDCl_3) δ 8.23 (d, $J = 4.8$ Hz, 1H), 7.72 (d, $J = 8.0$ Hz, 2H), 7.41 (t, $J = 8.3$ Hz, 4H), 7.32 (s, 3H), 7.07 (d, $J = 8.0$ Hz, 2H), 4.20 (t, $J = 7.1$ Hz, 2H), 3.32 (t, $J = 7.0$ Hz, 2H), 2.26 (s, 3H); $^{13}\text{C}\{^1\text{H}\}$ NMR (100 MHz, CDCl_3) δ 143.6, 141.0, 140.6, 135.3, 133.6, 132.0, 131.9, 129.5, 126.5, 125.0, 124.6, 123.4, 121.2, 118.1, 115.9, 114.0, 110.1, 45.4, 29.7, 27.5, 21.5; HRMS (ESI) $[\text{M}+\text{H}]^+$ Calcd for $[\text{C}_{24}\text{H}_{20}\text{BrN}_2\text{O}_2\text{S}]$ 479.0429 found 479.0440.



1-(2-bromoethyl)-2-(4-bromophenyl)-3-tosyl-1H-indole (2k). The product was obtained as a white solid (37.2 mg, 70%): mp 164-166 °C: $^1\text{H-NMR}$ (400 MHz, CDCl_3) δ 8.25-8.23 (m, 1H), 7.56 (d, $J = 8.5$ Hz, 2H), 7.43 (d, $J = 8.0$ Hz, 2H), 7.28 (d, $J = 9.8$ Hz, 3H), 7.10 (d, $J = 8.3$ Hz, 2H), 7.05 (d, $J = 8.0$ Hz, 2H), 4.19 (t, $J = 7.4$ Hz, 2H), 3.28 (t, $J = 7.4$ Hz, 2H), 2.25 (s, 3H); $^{13}\text{C}\{^1\text{H}\}$ NMR (100 MHz, CDCl_3) δ 143.6, 141.0, 140.6, 135.3, 133.6, 132.0, 131.9, 129.5, 126.5, 125.0, 124.6, 123.4, 121.2, 118.1, 115.9, 114.0, 110.1, 45.4, 29.7, 27.5, 21.5; HRMS (ESI) $[\text{M}+\text{H}]^+$ Calcd for $[\text{C}_{23}\text{H}_{20}\text{Br}_2\text{NO}_2\text{S}]$ 531.9581, found 531.9565.

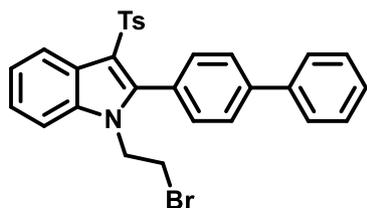


1-(2-bromoethyl)-2-(3-methoxyphenyl)-3-tosyl-1H-indole (2l). The product was obtained as a white solid (32.4 mg, 67%): mp 148-150 °C: $^1\text{H-NMR}$ (400 MHz, CDCl_3) δ 8.25 (t, $J = 3.6$ Hz, 1H), 7.42 (d, $J = 8.3$ Hz, 2H), 7.31-7.23 (m, 4H), 7.01-6.97 (m, 3H), 6.75 (d, $J = 7.5$ Hz, 1H), 6.69 (s, 1H), 4.18 (t, $J = 7.3$ Hz, 2H), 3.70 (s, 3H), 3.26 (t, $J = 6.8$ Hz, 2H), 2.21 (s, 3H); $^{13}\text{C}\{^1\text{H}\}$ NMR (100 MHz, CDCl_3) 159.3, 143.3, 143.1, 140.9, 135.1, 129.8, 129.5, 129.3, 126.7, 125.1, 124.0, 123.0, 123.0, 121.1, 116.4, 115.9, 115.0, 110.1, 55.4, 45.3, 27.8, 21.5; HRMS (ESI) $[\text{M}+\text{H}]^+$ Calcd for $[\text{C}_{24}\text{H}_{23}\text{BrNO}_3\text{S}]$ 484.0582, found 484.0582.



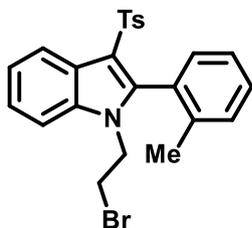
1-(2-bromoethyl)-2-(3-fluorophenyl)-3-tosyl-1H-indole (2m). The product was obtained as a white solid (31.1 mg, 66%): mp 160-162 °C: $^1\text{H-NMR}$ (400 MHz, CDCl_3) δ 8.27-8.24 (m, 1H), 7.46-7.38 (m, 3H), 7.30-7.28 (m, 3H), 7.20-7.17 (m, 1H), 7.06-7.03 (m, 3H), 6.90 (d, $J = 8.9$ Hz,

1H), 4.20 (t, J = 7.5 Hz, 2H), 3.29 (t, J = 7.4 Hz, 2H), 2.25 (s, 3H); $^{13}\text{C}\{^1\text{H}\}$ NMR (100 MHz, CDCl_3) δ 162 ($J_{\text{C-F}} = 248.53$ Hz), 143.3, 141.6, 140.7, 135.1, 130.6 ($J_{\text{C-F}} = 8.67$), 130.02 ($J_{\text{C-F}} = 8.67$) 129.3, 126.8, 126.6, 124.9, 124.2, 123.1, 121.2, 118.02 ($J_{\text{C-F}} = 22.19$), 117.2 ($J_{\text{C-F}} = 21.19$), 115.5, 109.9, 77.3, 77.0, 76.7, 45.2, 27.4, 21.4; HRMS (ESI) $[\text{M}+\text{H}]^+$ Calcd for $[\text{C}_{23}\text{H}_{20}\text{BrFNO}_2\text{S}]$ 472.0382, found 472.0375.



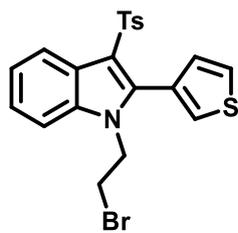
2-([1,1'-biphenyl]-4-yl)-1-(2-bromoethyl)-3-tosyl-1H-indole (2n) The

product was obtained as a white solid (31.3 mg, 59%): mp 210-212 °C: $^1\text{H-NMR}$ (400 MHz, CDCl_3) δ 8.29-8.26 (m, 1H), 7.66-7.62 (m, 4H), 7.47-7.42 (m, 4H), 7.37-7.28 (m, 6H), 7.03 (d, J = 8.0 Hz, 2H), 4.24 (t, J = 7.6 Hz, 2H), 3.32 (t, J = 7.6 Hz, 2H), 2.25 (s, 3H); $^{13}\text{C}\{^1\text{H}\}$ NMR (100 MHz, CDCl_3) δ 143.2, 143.1, 142.7, 140.9, 140.0, 135.1, 131.2, 129.2, 129.0, 128.0, 127.4, 127.2, 126.9, 126.7, 125.1, 124.0, 123.0, 121.2, 115.3, 109.9, 45.2, 27.5, 21.4; HRMS (ESI) $[\text{M}+\text{H}]^+$ Calcd for $[\text{C}_{29}\text{H}_{25}\text{BrNO}_2\text{S}]$ 530.0789, found 530.0794.



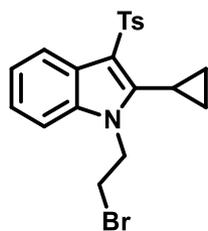
1-(2-bromoethyl)-2-(o-tolyl)-3-tosyl-1H-indole (2o)

The product was obtained as a white solid (30.4 mg, 65%): mp 158-160 °C: $^1\text{H-NMR}$ (400 MHz, CDCl_3) δ 8.33-8.29 (m, 1H), 7.42-7.37 (m, 3H), 7.35-7.28 (m, 3H), 7.25-7.21 (m, 2H), 7.07-7.02 (m, 3H), 4.27-4.19 (m, 1H), 3.98-3.90 (m, 1H), 3.31-3.18 (m, 2H), 2.26 (s, 3H), 1.79 (s, 3H); $^{13}\text{C}\{^1\text{H}\}$ NMR (100 MHz, CDCl_3) δ 143.1, 142.9, 140.7, 138.3, 135.1, 131.0, 130.4, 130.2, 129.2, 128.1, 126.8, 125.6, 125.1, 123.8, 122.9, 121.1, 114.9, 109.9, 45.0, 27.3, 21.4, 19.7; HRMS (ESI) $[\text{M}+\text{H}]^+$ Calcd for $[\text{C}_{24}\text{H}_{23}\text{BrNO}_2\text{S}]$ 468.0633, found 468.0629.



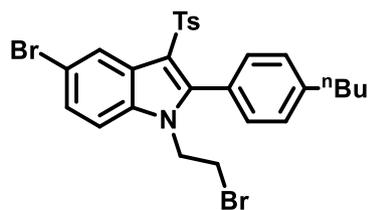
1-(2-bromoethyl)-2-(thiophen-3-yl)-3-tosyl-1H-indole (2p) The product was

obtained as a white solid (26.7 mg, 58%): mp 180-182 °C: $^1\text{H-NMR}$ (400 MHz, CDCl_3) δ 8.30-8.26 (m, 1H), 7.41-7.38 (m, 3H), 7.34 (dd, $J = 3.0, 1.2$ Hz, 1H), 7.30-7.25 (m, 3H), 7.02 (d, $J = 8.1$ Hz, 3H), 6.96 (dd, $J = 4.9, 1.2$ Hz, 1H), 4.23 (t, $J = 7.5$ Hz, 2H), 3.30 (t, $J = 7.5$ Hz, 2H), 2.24 (s, 3H); $^{13}\text{C}\{1\text{H}\}$ NMR (100 MHz, CDCl_3) δ 143.0, 140.7, 138.6, 135.1, 129.3, 129.2, 128.7, 127.8, 126.5, 126.0, 125.1, 124.0, 122.9, 121.1, 115.7, 109.8, 45.2, 27.6, 21.4; HRMS (ESI) $[\text{M}+\text{H}]^+$ Calcd for $[\text{C}_{21}\text{H}_{19}\text{BrNO}_2\text{S}_2]$ 460.0041, found 460.0020



1-(2-bromoethyl)-2-cyclopropyl-3-tosyl-1H-indole (2q) The product was obtained

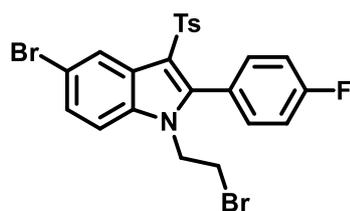
as a white solid (25.1 mg, 60%): mp 134-136 °C: $^1\text{H-NMR}$ (400 MHz, CDCl_3) δ 8.03-7.99 (m, 1H), 7.77 (dd, $J = 6.7, 1.6$ Hz, 2H), 7.24-7.16 (m, 5H), 4.48 (t, $J = 7.4$ Hz, 2H), 3.51 (t, $J = 7.4$ Hz, 2H), 3.29-3.23 (m, 4H), 2.28 (s, 3H), 2.12-2.06 (m, 1H); $^{13}\text{C}\{1\text{H}\}$ NMR (100 MHz, CDCl_3) δ 143.5, 143.4, 141.0, 135.2, 129.6, 126.2, 125.1, 123.6, 122.8, 120.3, 112.6, 109.5, 44.7, 33.7, 27.8, 26.1, 21.5, 6.1; HRMS (ESI) $[\text{M}+\text{H}]^+$ Calcd for $[\text{C}_{20}\text{H}_{21}\text{BrNO}_2\text{S}]$ 418.0476, found 418.0476.



5-bromo-1-(2-bromoethyl)-2-(4-butylphenyl)-3-tosyl-1H-indole (4a).

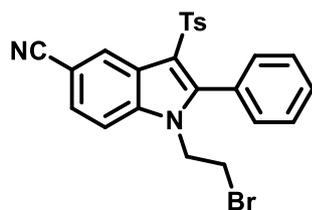
The product was obtained as a white solid (39.9 mg, 60%): mp 168-170 °C: $^1\text{H-NMR}$ (400 MHz,

CDCl₃) δ 8.45 (d, J = 1.8 Hz, 1H), 7.38-7.34 (m, 3H), 7.22-7.19 (m, 3H), 7.08 (dd, J = 6.5, 1.8 Hz, 2H), 7.01 (d, J = 8.0 Hz, 2H), 4.17 (t, J = 7.5 Hz, 2H), 3.24 (t, J = 7.4 Hz, 2H), 2.66 (t, J = 7.8 Hz, 2H), 2.26 (s, 3H), 1.67-1.59 (m, 2H), 1.37 (dt, J = 22.4, 7.4 Hz, 2H), 0.94-0.90 (m, 3H); ¹³C{¹H} NMR (100 MHz, CDCl₃) δ 145.3, 144.7, 143.2, 140.5, 133.8, 130.5, 129.2, 128.4, 126.8, 126.7, 125.1, 123.6, 116.3, 114.9, 111.3, 45.2, 35.6, 33.3, 29.7, 27.5, 22.4, 21.5, 14.0; HRMS (ESI) [M+H]⁺ Calcd for [C₂₇H₂₈Br₂NO₂S] 588.0208, found 588.0201.



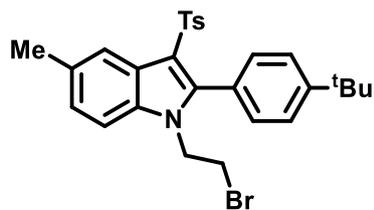
5-bromo-1-(2-bromoethyl)-2-(4-fluorophenyl)-3-tosyl-1H-indole (4b).

The product was obtained as a white solid (35.7 mg, 55%): mp 166-168 °C: ¹H-NMR (400 MHz, CDCl₃) δ 8.41 (d, J = 1.8 Hz, 1H), 7.34 (dd, J = 8.6, 1.9 Hz, 3H), 7.20-7.16 (m, 4H), 7.12-7.08 (m, 2H), 7.04 (d, J = 8.1 Hz, 2H), 4.17 (t, J = 7.2 Hz, 2H), 3.26 (t, J = 7.2 Hz, 2H), 2.26 (s, 3H); ¹³C{¹H} NMR (100 MHz, CDCl₃); δ 163.7 (J_{C-F} = 251.4) 143.4 (J_{C-F} = 23.14), 140.4, 133.7, 132.8 (J_{C-F} = 8.67), 129.3, 127.6, 127.1, 126.5, 123.9, 123.5, 116.5, 115.6 (J_{C-F} = 22.16), 115.1, 111.5, 45.2, 27.5, 21.4; HRMS (ESI) [M+H]⁺ Calcd for [C₂₃H₁₉Br₂FNO₂S] 549.9487, found, 549.9475.



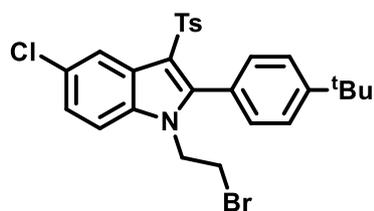
1-(2-bromoethyl)-2-phenyl-3-tosyl-1H-indole-5-carbonitrile (4c). The

product was obtained as a white solid (27.1 mg, 58%): mp 152-154 °C: ¹H-NMR (400 MHz, CDCl₃) δ 8.02 (s, 1H), 7.54 (dd, J = 20.9, 8.4 Hz, 3H), 7.30 (dd, J = 18.9, 8.1 Hz, 7H), 4.57 (t, J = 7.1 Hz, 2H), 3.44 (t, J = 7.3 Hz, 2H), 2.46 (s, 3H); ¹³C-NMR (100 MHz, CDCl₃) δ 147.8, 139.8, 138.6, 132.9, 130.7, 130.2, 129.5, 129.1, 128.9, 126.9, 126.3, 126.0, 125.9, 120.2, 110.7, 45.9, 28.3, 21.5; HRMS (ESI) [M+H]⁺ Calcd for [C₂₄H₂₀BrN₂O₂S] 479.0429 found 479.0410.



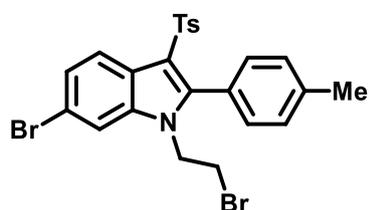
1-(2-bromoethyl)-2-(4-(tert-butyl)phenyl)-5-methyl-3-tosyl-1H-indole

(4d). The product was obtained as a white solid (30.39 mg, 65%): mp 168-170 °C: ¹H-NMR (400 MHz, CDCl₃) δ 8.08 (s, 1H), 7.37 (dd, J = 12.2, 8.2 Hz, 3H), 7.19 (d, J = 8.0 Hz, 2H), 7.11-7.05 (m, 3H), 7.02-6.97 (m, 2H), 4.16 (t, J = 7.6 Hz, 2H), 3.26 (t, J = 7.6 Hz, 2H), 2.45 (s, 3H), 2.24 (s, 3H), 1.33 (s, 9H); ¹³C{¹H} NMR (100 MHz, CDCl₃) 153.0, 143.6, 142.7, 140.8, 133.3, 132.5, 131.3, 130.4, 129.5, 129.4, 129.0, 128.8, 128.3, 127.5, 126.7, 125.8, 125.5, 125.3, 125.2, 120.6, 114.5, 109.4, 45.1, 34.9, 31.3, 27.7, 21.6, 21.4; HRMS (ESI) [M+H]⁺ Calcd for [C₂₈H₃₁BrNO₂S] 524.1259, found 524.1259.



1-(2-bromoethyl)-2-(4-tert-butylphenyl)-5-chloro-3-tosyl-1H-indole

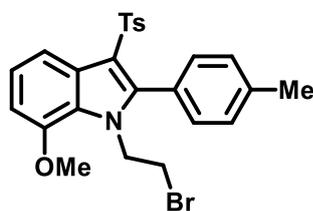
(4e). The product was obtained as a brown solid (32.6 mg, 60%): mp 175-178 °C: ¹H-NMR (400 MHz, CDCl₃) δ 8.30 (s, 1H), 7.40 (d, J = 8.3 Hz, 2H), 7.31 (d, J = 8.3 Hz, 2H), 7.23 (s, 2H), 7.09 (d, J = 8.0 Hz, 2H), 6.99 (d, J = 8.0 Hz, 2H), 4.18 (t, J = 7.4 Hz, 2H), 3.26 (t, J = 7.4 Hz, 2H), 2.25 (s, 3H), 1.34 (s, 9H); ¹³C{¹H} NMR (100 MHz, CDCl₃) δ 160.7, 153.4, 144.8, 144.3, 143.1, 140.4, 133.4, 130.4, 129.1, 129.0, 128.8, 127.6, 127.0, 126.8, 126.1, 125.3, 124.9, 124.3, 120.7, 110.9, 45.3, 34.9, 31.3, 29.7, 27.5, 21.5; HRMS (ESI) [M+H]⁺ Calcd for [C₂₇H₂₈BrClNO₂S] 544.0713, found, 544.0710.



6-bromo-1-(2-bromoethyl)-2-(p-tolyl)-3-tosyl-1H-indole **(4f).**

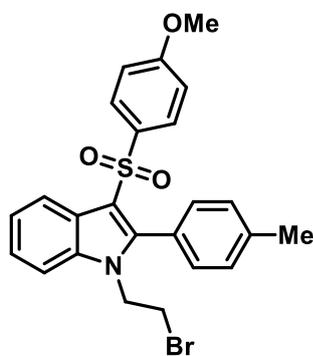
The product was obtained as a white solid (36.5 mg, 67%): mp 187-189 °C: ¹H-NMR (400 MHz, CDCl₃) δ 8.12 (d, J = 8.7 Hz, 1H), 7.46 (d, J = 1.4 Hz, 1H), 7.41-7.37 (m, 3H), 7.23 (d, J = 7.8 Hz, 2H), 7.09 (d, J = 8.0 Hz, 2H), 7.04 (d, J = 8.0 Hz, 2H), 4.15 (t, J = 7.6 Hz, 2H), 3.27-3.23 (m, 2H), 2.41 (s, 3H), 2.26 (s, 3H); ¹³C{¹H} NMR (100 MHz, CDCl₃) 144.3, 143.2, 140.7, 140.4, 130.5, 129.3, 129.1, 126.6, 126.2,

125.0, 122.4, 117.5, 112.9, 45.2, 27.3, 21.6, 21.5; HRMS (ESI) $[M+H]^+$ Calcd for $[C_{24}H_{22}Br_2NO_2S]$ 545.9738, found 545.9620.



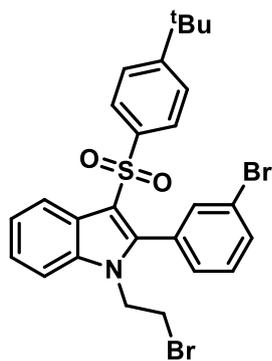
1-(2-bromoethyl)-2-(4-tert-butylphenyl)-5-chloro-3-tosyl-1H-indole (4e).

The product was obtained as a brown solid (34.8 mg, 70%): mp 190-192 °C: 1H -NMR (400 MHz, $CDCl_3$) δ 7.83 (dd, $J = 8.2, 0.8$ Hz, 1H), 7.43 (dd, $J = 6.7, 1.7$ Hz, 2H), 7.21 (d, $J = 7.8$ Hz, 2H), 7.16 (d, $J = 8.8$ Hz, 1H), 7.08 (dd, $J = 6.4, 1.7$ Hz, 2H), 7.02 (d, $J = 8.0$ Hz, 2H), 6.68 (dd, $J = 8.0, 0.5$ Hz, 1H), 4.33 (t, $J = 7.8$ Hz, 2H), 3.87 (s, 3H), 3.34-3.30 (m, 2H), 2.39 (s, 3H), 2.24 (s, 3H); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$) δ 146.8, 144.3, 142.8, 141.0, 139.9, 130.7, 129.6, 129.1, 128.9, 127.4, 127.1, 126.5, 125.6, 124.8, 123.2, 114.8, 113.2, 104.5, 55.7, 47.4, 29.5, 21.5; HRMS (ESI) $[M+H]^+$ Calcd for $[C_{25}H_{25}BrNO_3S]$ 498.0739, found, 498.0725.



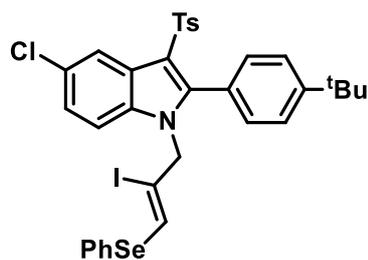
1-(2-bromoethyl)-3-((4-methoxyphenyl)sulfonyl)-2-(p-tolyl)-1H-

indole(6a). The product was obtained as a white solid (30.5 mg, 68%): mp 160-164 °C: 1H -NMR (400 MHz, $CDCl_3$) δ 7.87-7.83 (m, 2H), 7.80 (dd, $J = 7.8, 1.1$ Hz, 1H), 7.32 (dd, $J = 7.7, 1.0$ Hz, 1H), 7.06-6.97 (m, 8H), 4.94 (t, $J = 7.5$ Hz, 2H), 3.83 (s, 3H), 3.20 (t, $J = 7.5$ Hz, 2H), 2.34 (s, 3H); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$) δ 163.8, 149.2, 139.4, 134.4, 133.3, 131.7, 131.4, 130.6, 130.5, 129.2, 129.0, 128.6, 127.6, 126.8, 126.7, 125.7, 125.2, 120.0, 114.6, 101.0, 55.7, 48.6, 29.7, 21.4; HRMS (ESI) $[M+H]^+$ Calcd for $[C_{24}H_{23}BrNO_3S]$ 484.0582, found 484.0582.



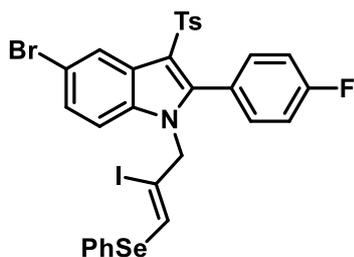
1-(2-bromoethyl)-2-(3-bromophenyl)-3-((4-(tert-butyl)phenyl)sulfonyl)-1H-

indole (6b). The product was obtained as a dark brown solid (29.7 mg, 65%): mp 174-176 °C: $^1\text{H-NMR}$ (400 MHz, CDCl_3) δ 8.32-8.28 (m, 1H), 7.62 (dt, $J = 7.8, 1.6$ Hz, 1H), 7.47-7.45 (m, 2H), 7.36-7.28 (m, 7H), 7.19 (d, $J = 1.9$ Hz, 1H), 4.22 (t, $J = 7.5$ Hz, 2H), 3.31 (t, $J = 7.5$ Hz, 2H), 1.21 (s, 9H); $^{13}\text{C}\{1\text{H}\}$ NMR (100 MHz, CDCl_3) δ 156.3, 141.4, 140.4, 135.0, 133.3, 133.1, 130.5, 129.9, 126.5, 125.7, 125.0, 124.3, 123.2, 122.2, 121.3, 109.9, 45.2, 31.0, 29.7, 27.4; HRMS (ESI) $[\text{M}+\text{H}]^+$ Calcd for $[\text{C}_{26}\text{H}_{26}\text{Br}_2\text{NO}_2\text{S}]$ 574.0051, found 574.0051.



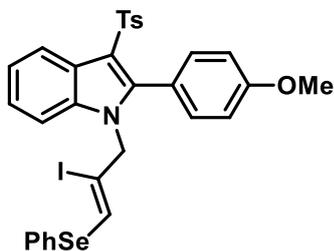
(E)-2-(4-(tert-butylphenyl)-5-chloro-1-(2-iodo-3-(phenylselanyl)allyl)-

3-tosyl-1H-indole (8a). The product was obtained as a solid (49.4 mg, 65%): mp 216-218 °C: $^1\text{H-NMR}$ (400 MHz, CDCl_3) δ 8.32-8.29 (m, 1H), 7.62 (dt, $J = 7.8, 1.6$ Hz, 1H), 7.46 (dd, $J = 6.7, 1.8$ Hz, 2H), 7.36-7.28 (m, 10H), 7.19 (d, $J = 1.9$ Hz, 2H), 4.63 (s, 1H), 4.24-4.18 (m, 2H), 3.31 (t, $J = 7.5$ Hz, 2H), 1.21 (s, 9H); $^{13}\text{C}\{1\text{H}\}$ NMR (100 MHz, CDCl_3) δ 153.3, 145.5, 143.0, 140.5, 133.6, 131.2, 129.1, 128.9, 126.7, 126.3, 125.2, 124.7, 124.4, 120.6, 112.0, 97.8, 82.3, 54.8, 34.9, 31.3, 29.7, 21.5; HRMS (ESI) $[\text{M}+\text{H}]^+$ Calcd for $[\text{C}_{34}\text{H}_{32}\text{ClINO}_2\text{SSe}]$ 760.0052, found 760.0044.



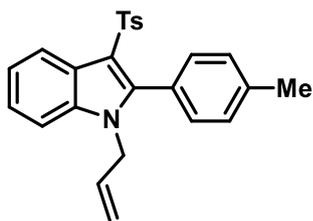
(Z)-5-bromo-2-(4-fluorophenyl)-1-(2-iodo-3-(phenylselanylallyl))-3-

tosyl-1H-indole (**8b**). The product was obtained as a brown solid (45.9 mg, 60%): mp 220-222 °C: $^1\text{H-NMR}$ (400 MHz, CDCl_3) δ 8.37 (dd, $J = 5.4, 1.8$ Hz, 1H), 7.35 (d, $J = 8.1$ Hz, 2H), 7.27-7.18 (m, 6H), 7.06-6.96 (m, 7H), 4.66 (s, 2H), 2.22 (s, 3H); $^{13}\text{C}\{^1\text{H}\}$ NMR (100 MHz, CDCl_3) δ 163.6 ($J_{\text{C-F}} = 187.8$ Hz), 143.5 ($J_{\text{C-F}} = 8.67$ Hz), 140.7, 140.6, 134.4, 133.4, 133.3, 132.2, 132.1, 131.5, 129.8, 129.6, 129.5, 129.3, 128.5, 128.1, 127.7, 126.9, 126.8, 126.5, 125.6, 123.3, 116.4, 115.3 ($J_{\text{C-F}} = 22.16$ Hz), 115.1, 112.4, 112.3, 83.2, 52.5, 48.5, 21.4; HRMS (ESI) $[\text{M}+\text{H}]^+$ Calcd for $[\text{C}_{30}\text{H}_{23}\text{BrFINO}_2\text{SSe}]$ 765.8827, found 765.8827.



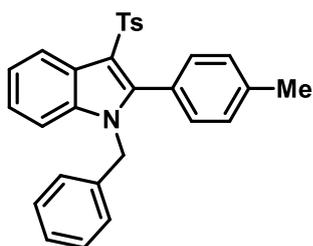
(Z)-5-bromo-1-(2-iodo-3-(phenylselanylallyl))-2-(4-methoxyphenyl)-3-

tosyl-1H-indole (**8c**). The product was obtained as a solid (53.2 mg, 70%): mp 224-226 °C: $^1\text{H-NMR}$ (400 MHz, CDCl_3) δ 8.28 (d, $J = 8.8$ Hz, 1H), 7.43 (d, $J = 8.2$ Hz, 2H), 7.31-7.25 (m, 5H), 7.06-7.01 (m, 4H), 6.93 (d, $J = 8.7$ Hz, 4H), 4.67 (s, 2H), 3.84 (s, 3H), 2.25 (s, 3H); $^{13}\text{C}\{^1\text{H}\}$ NMR (100 MHz, CDCl_3) δ 142.9, 141.2, 133.1, 129.2, 126.5, 123.8, 123.5, 122.8, 122.7, 120.9, 113.7, 110.7, 81.8, 55.5, 54.6, 31.9, 22.7, 14.1; HRMS (ESI) $[\text{M}+\text{H}]^+$ Calcd for $[\text{C}_{31}\text{H}_{27}\text{INO}_3\text{SSe}]$ 699.9922, found 699.9922.



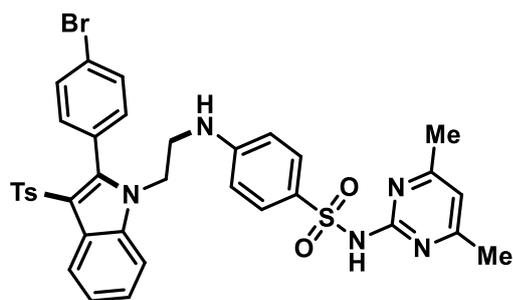
(R)-3-(4-fluorophenyl)-2-(2-hydroxy-1-phenylethyl)-4-

iodobenzo[b][1,6]naphthyridin-1(2H)-one (8d). The product was obtained as a white solid (27.3 mg, 68%): mp 130-132 °C: $^1\text{H-NMR}$ (400 MHz, CDCl_3) δ 8.25-8.22 (m, 1H), 7.46 (d, $J = 8.4$ Hz, 2H), 7.26-7.16 (m, 5H), 7.10 (d, $J = 8.1$ Hz, 2H), 7.02 (d, $J = 8.0$ Hz, 2H), 5.72-5.63 (m, 1H), 5.03-5.01 (m, 1H), 4.76-4.72 (m, 1H), 4.38 (td, $J = 3.2, 1.5$ Hz, 2H), 2.37 (s, 3H), 2.23 (s, 3H); $^{13}\text{C}\{^1\text{H}\}$ NMR (100 MHz, CDCl_3) δ 144.2, 142.7, 141.2, 139.7, 138.7, 135.4, 133.1, 132.1, 130.5, 129.5, 129.3, 129.1, 128.9, 128.8, 128.6, 128.2, 127.3, 126.4, 125.9, 125.0, 123.8, 123.4, 122.8, 122.4, 121.3, 120.9, 120.6, 117.3, 116.9, 115.6, 113.7, 110.6, 109.8, 101.1, 46.4, 21.5, 21.4; HRMS (ESI) $[\text{M}+\text{H}]^+$ Calcd for $[\text{C}_{25}\text{H}_{24}\text{NO}_2\text{S}]$ 402.1528, found 402.1543.



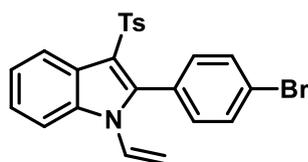
1-benzyl-2-(p-tolyl)-3-tosyl-1H-indole (8e). The product was obtained as a

white solid (31.2 mg, 69%): mp 145-148 °C: $^1\text{H-NMR}$ (400 MHz, CDCl_3) δ 8.27 (d, $J = 8.0$ Hz, 1H), 7.50 (d, $J = 8.2$ Hz, 2H), 7.28-7.22 (m, 1H), 7.18-7.04 (m, 11H), 6.78 (t, $J = 3.6$ Hz, 2H), 5.03 (s, 2H), 2.35 (s, 3H), 2.25 (s, 3H); $^{13}\text{C}\{^1\text{H}\}$ NMR (100 MHz, CDCl_3) δ 144.6, 142.8, 141.2, 139.7, 136.2, 135.6, 130.6, 129.6, 129.4, 129.1, 128.8, 128.7, 127.5, 127.3, 126.5, 125.9, 125.8, 125.2, 123.5, 122.5, 120.7, 114.1, 110.9, 101.4, 47.9, 29.6, 21.4; HRMS (ESI) $[\text{M}+\text{H}]^+$ Calcd for $[\text{C}_{29}\text{H}_{26}\text{NO}_2\text{S}]$ 452.1684, found 452.1678.



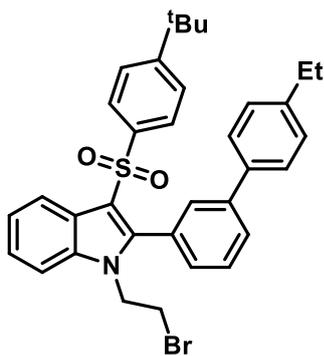
4-((2-(2-(4-bromophenyl)-3-tosyl-1H-indol-1-

ylethylamino)-N-(4,6-dimethylpyrimidin-2-yl)benzenesulfonamide (**9b**). The product was obtained as a white solid (54.7 mg, 75%): mp 248-250 °C: $^1\text{H-NMR}$ (400 MHz, CDCl_3) δ 8.24 (d, $J = 8.7$ Hz, 1H), 7.80 (d, $J = 7.4$ Hz, 1H), 7.45-7.27 (m, 8H), 7.04 (d, $J = 8.1$ Hz, 2H), 6.88 (d, $J = 8.4$ Hz, 2H), 6.52-6.49 (m, 3H), 4.34-4.29 (m, 4H), 2.25 (s, 3H), 2.18 (s, 6H); $^{13}\text{C}\{^1\text{H}\}$ NMR (100 MHz, CDCl_3) δ 143.3, 140.6, 135.0, 132.8, 131.3, 129.6, 129.3, 127.8, 126.6, 125.4, 124.5, 123.4, 121.1, 111.6, 110.2, 21.5, 21.3; HRMS (ESI) $[\text{M}+\text{H}]^+$ Calcd for $[\text{C}_{35}\text{H}_{33}\text{BrN}_5\text{O}_4\text{S}_2]$ 730.1157, found 730.1136.



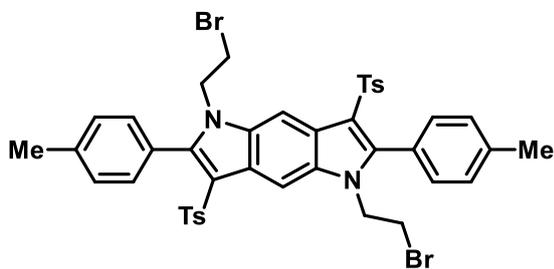
2-(4-bromophenyl)-3-tosyl-1-vinyl-1H-indole (**10b**). The product was

obtained as a brown solid (31.6 mg, 85%): mp 140-142 °C: $^1\text{H-NMR}$ (400 MHz, CDCl_3) δ 8.29-8.25 (m, 1H), 7.58-7.52 (m, 3H), 7.45 (d, $J = 8.4$ Hz, 2H), 7.30 (dd, $J = 6.9, 2.4$ Hz, 2H), 7.14 (d, $J = 8.4$ Hz, 2H), 7.06 (d, $J = 8.1$ Hz, 2H), 6.45 (dd, $J = 15.9, 8.9$ Hz, 1H), 5.29 (dd, $J = 15.9, 1.0$ Hz, 1H), 5.11 (dd, $J = 8.9, 1.0$ Hz, 1H), 2.26 (s, 3H); $^{13}\text{C}\{^1\text{H}\}$ NMR (100 MHz, CDCl_3) δ 143.3, 142.0, 140.7, 135.1, 132.4, 131.6, 129.3, 127.5, 126.6, 125.0, 124.8, 124.2, 123.1, 121.2, 115.5, 109.9, 45.2, 27.4, 21.5; HRMS (ESI) $[\text{M}+\text{H}]^+$ Calcd for $[\text{C}_{23}\text{H}_{19}\text{BrNO}_2\text{S}]$ 452.0320, found 452.0250.



1-(2-bromoethyl)-3-(4-(tert-butylphenyl)sulfonyl)-2-(4'-ethyl-[1,1'-

biphenyl]-3-yl)-1H-indole(11b). The product was obtained as a white solid (36.0 mg, 60%): mp 216-218 °C: $^1\text{H-NMR}$ (400 MHz, CDCl_3) δ 8.36-8.32 (m, 1H), 7.70 (d, $J = 7.8$ Hz, 1H), 7.62 (d, $J = 9.2$ Hz, 1H), 7.51-7.40 (m, 5H), 7.33-7.28 (m, 4H), 7.24-7.15 (m, 4H), 4.27-4.21 (m, 2H), 3.31 (t, $J = 7.5$ Hz, 2H), 2.63 (q, $J = 7.6$ Hz, 2H), 1.21 (d, $J = 8.0$ Hz, 3H), 1.13 (s, 9H); $^{13}\text{C}\{^1\text{H}\}$ NMR (100 MHz, CDCl_3) δ 155.4, 155.0, 143.2, 142.6, 140.1, 139.7, 139.5, 136.4, 134.1, 132.4, 132.2, 129.7, 129.0, 128.5, 128.3, 128.0, 127.9, 127.6, 127.5, 126.1, 125.6, 124.8, 124.6, 124.3, 124.1, 123.3, 123.0, 122.2, 122.1, 121.2, 120.3, 114.4, 109.0, 44.3, 34.0, 30.1, 28.8, 27.6, 14.7; HRMS (ESI) $[\text{M}+\text{H}]^+$ Calcd for $[\text{C}_{34}\text{H}_{35}\text{BrNO}_2\text{S}]$ 600.1572, found 600.1543.

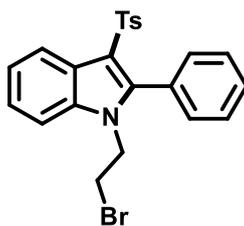


1,5-bis(2-bromoethyl)-2,6-di-p-tolyl-3,7-ditosyl-1,5-

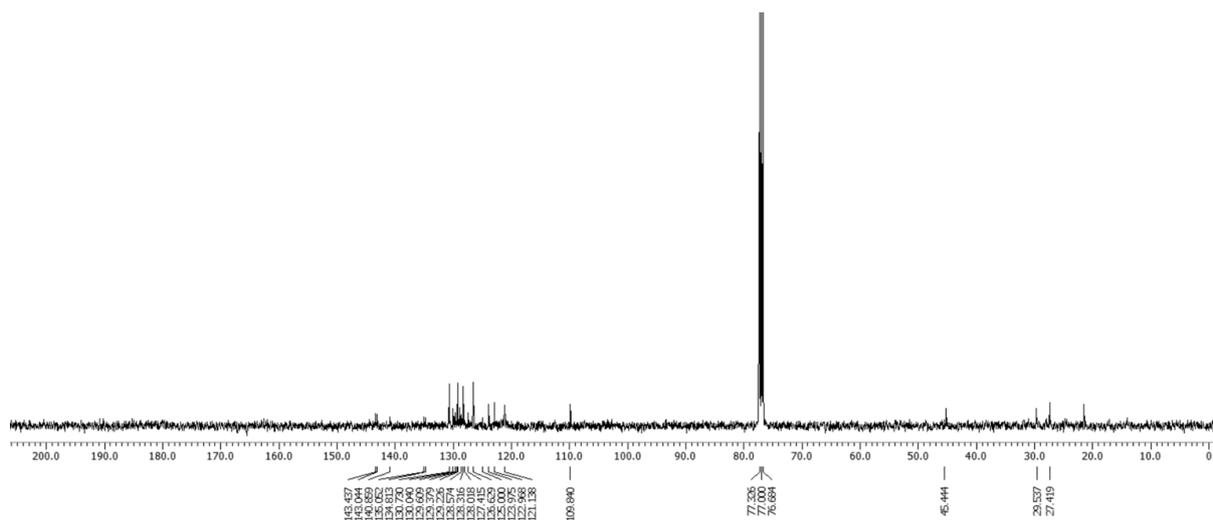
dihydropyrrolo[2,3-f] indole (12b). The product was obtained as a orange solid (17.1 mg, 40%): mp 200-202 °C: $^1\text{H-NMR}$ (400 MHz, CDCl_3) δ 8.21 (s, 2H), 7.42 (d, $J = 8.2$ Hz, 3H), 7.36 (s, 2H), 7.24 (d, $J = 7.8$ Hz, 4H), 7.15 (d, $J = 8.0$ Hz, 3H), 7.02 (d, $J = 8.2$ Hz, 4H), 4.37 (t, $J = 7.1$ Hz, 4H), 3.39 (t, $J = 7.1$ Hz, 4H), 2.43 (s, 6H), 2.25 (s, 6H); HRMS (ESI) $[\text{M}+\text{H}]^+$ Calcd for $[\text{C}_{42}\text{H}_{39}\text{Br}_2\text{N}_2\text{O}_4\text{S}_2]$ 857.0718, found 857.0610.

Copies of ^1H , ^{13}C and HRMS

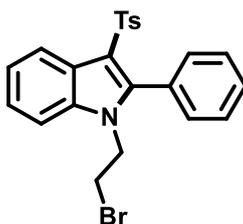
^{13}C { ^1H } NMR (100 MHz, CDCl_3)



1-(2-bromoethyl)-2-phenyl-3-tosyl-1H-indole(**2a**)



HRMS



1-(2-bromoethyl)-2-phenyl-3-tosyl-1H-indole(2a)

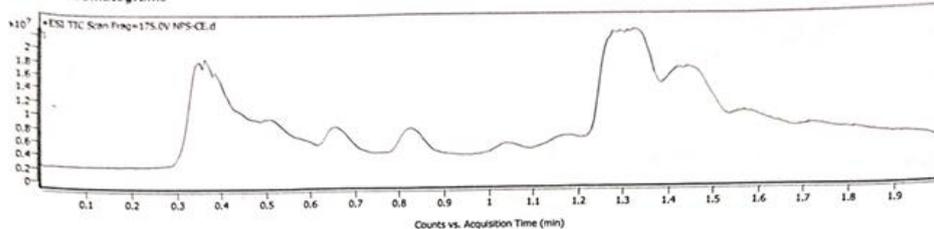
Compound Screening Report



Sample Information

Sample Name	NPS-CE	Data File Path	D:\Projects\FIC\88_Alt\Data\NPS-CE.d
Sample ID		Acq Time (Local)	04/09/2025 14:31:54 (UTC+05:30)
Instrument	INT-QTOF	Acq Method Path	D:\Projects\FIC\88_Alt\Methods\eng.dar.m
MS Type	QTOF	Acq SW Version	6500 series Q-TOF (12.1.98.0)
Inj Vol (ul)	3	IRM Status	Success
Sample Position	P2-09	DA Method Path	D:\Projects\Instrument_Verification\Methods\default.m
Plate Position		Target Source Path	
Acq Operator	SYSTEM (SYSTEM)	Result Summary	1 qualified (1 targets)

Sample Chromatograms



Compound Summary

Cpd Name	Formula	CAS	RT	Mass	Mass (Tgt)	Diff (Tgt, ppm)	Score	Algorithm
1	C23 H21 Br N O2 S		1.816	454.0478	454.0476	0.46	97.42	FBF

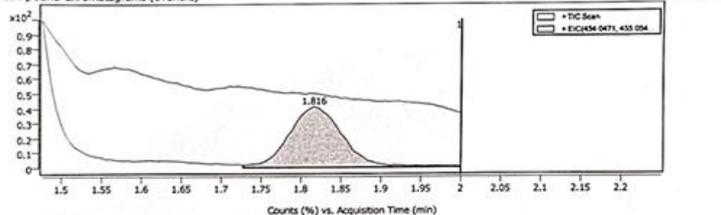
Compound Details

Cpd 1: C23 H21 Br N O2 S

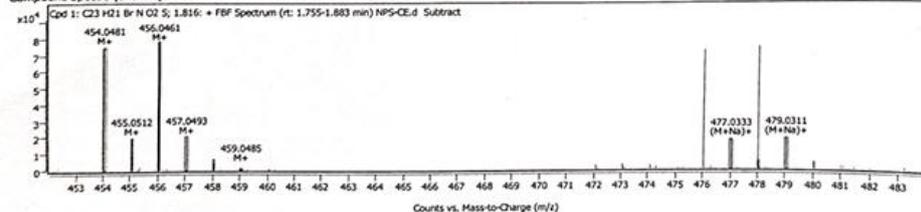
Name	Formula	RT	RI	Mass	Diff (Tgt, ppm)	CAS	ID Source	Score	Algorithm
1	C23 H21 Br N O2 S	1.816		454.0478	0.46		FBF	97.42	FBF

Species	m/z	Score (Tgt)	Score (Lib)	Score (DB)	Score (MEG)	Score (RT)
M+ (M+Na)+	454.0481 477.0333	97.42				

Compound Chromatograms (overlaid)



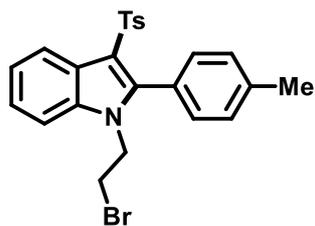
Compound Spectra (overlaid)



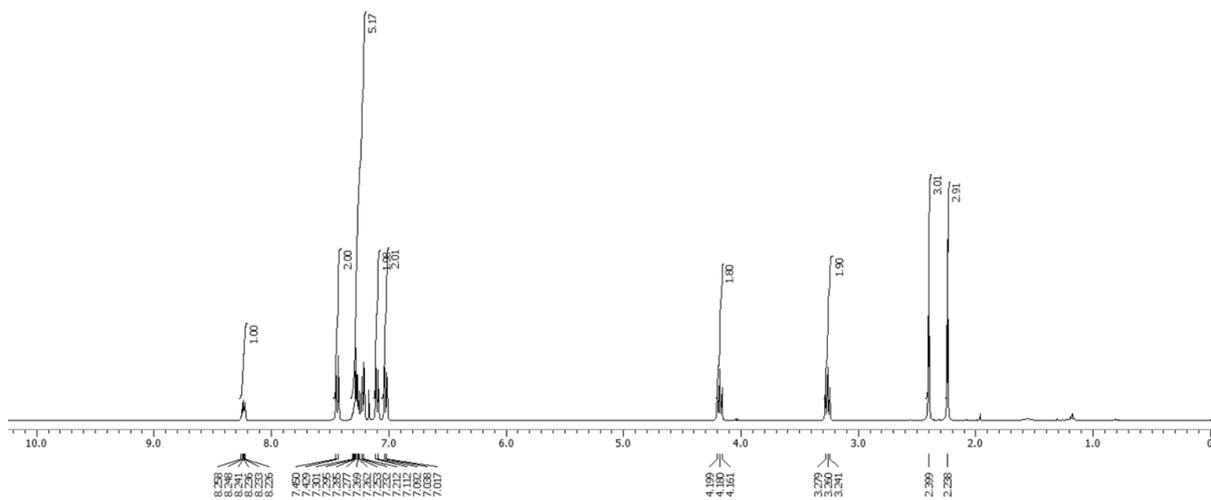
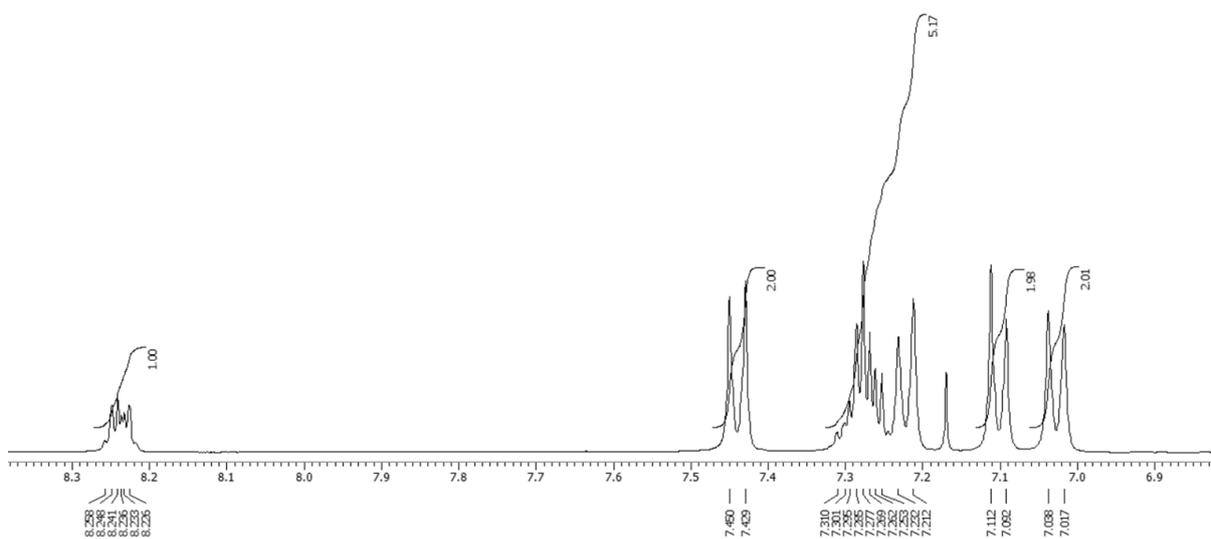
Compound ID Table

Name	Formula	Species	RT	RT Diff	Mass	CAS	ID Source	Score	Score (Lib)	Score (Tgt)
1	C23 H21 Br N O2 S	M+ (M+Na)+	1.816		454.0478		FBF	97.42		97.42

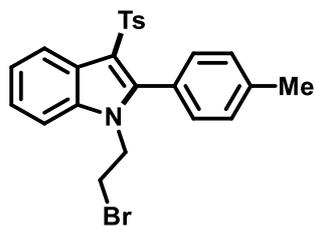
¹H NMR (400 MHz, CDCl₃)



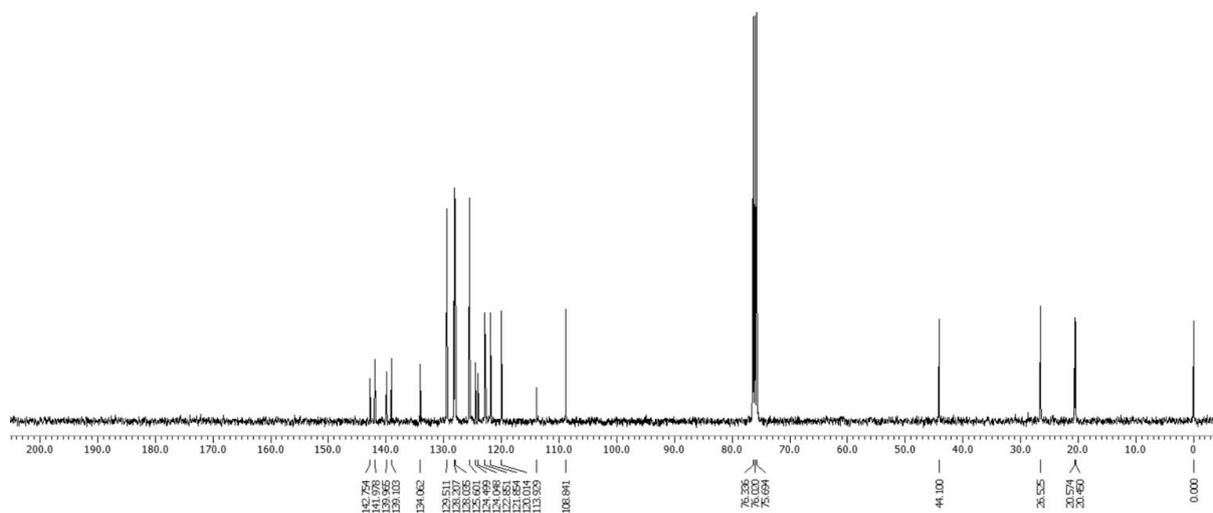
1-(2-bromoethyl)-2-phenyl-3-tosyl-1H-indole(2b)



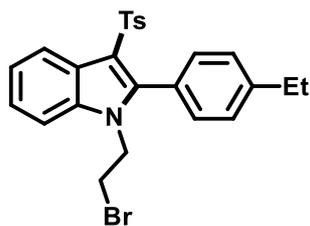
^{13}C { ^1H } NMR (100 MHz, CDCl_3)



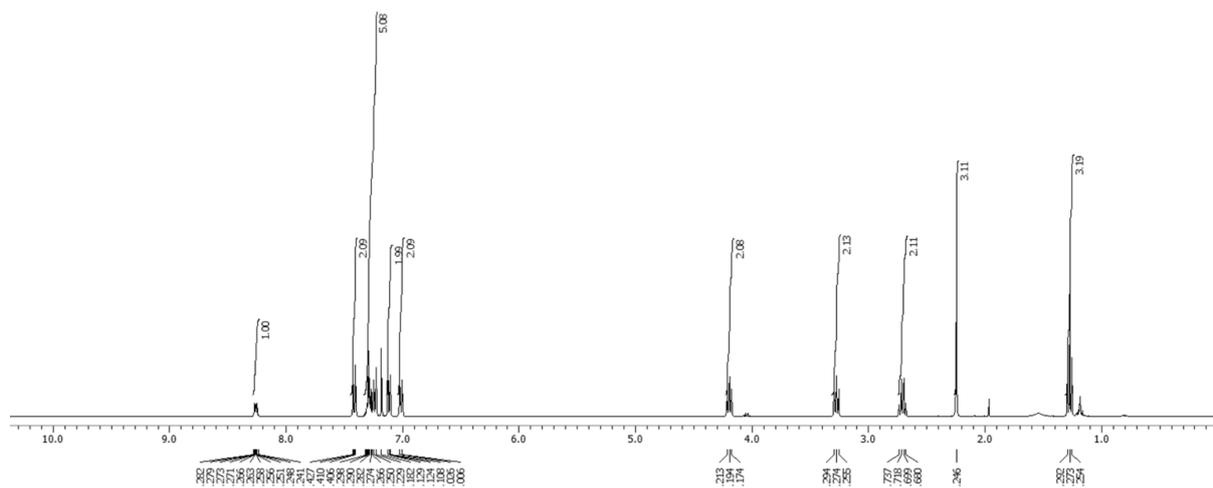
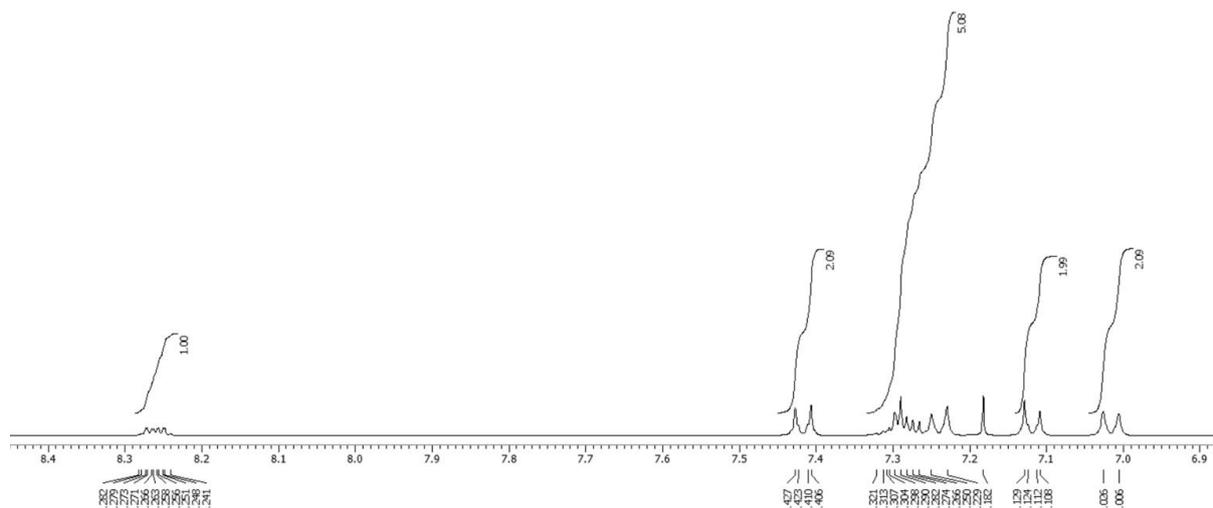
1-(2-bromoethyl)-2-phenyl-3-tosyl-1H-indole(**2b**)



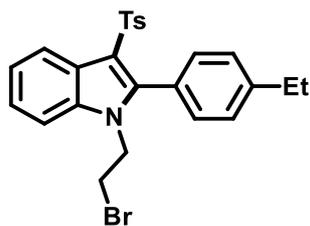
¹H NMR (400 MHz, CDCl₃)



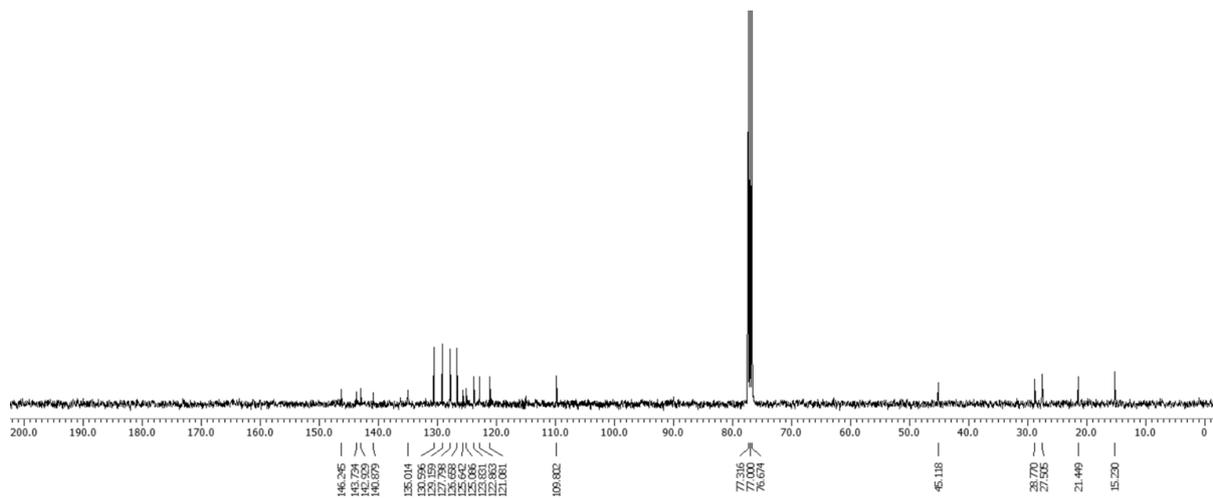
1-(2-bromoethyl)-2-(4-ethylphenyl)-3-tosyl-1H-indole (**2c**)



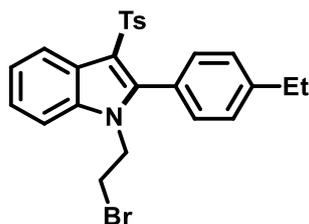
^{13}C { ^1H } NMR (100 MHz, CDCl_3)



1-(2-bromoethyl)-2-(4-ethylphenyl)-3-tosyl-1H-indole(**2c**)



HRMS



1-(2-bromoethyl)-2-(4-ethylphenyl)-3-tosyl-1H-indole(2c)

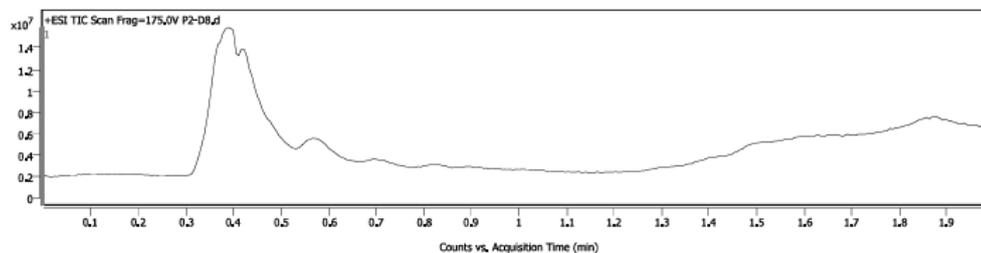
Compound Screening Report



Sample Information

Sample Name	NPS-P16A	Data File Path	D:\Projects\REGULAR\Data\P2-D8.d
Sample ID		Acq Time (Local)	13-09-2025 16:18:05 (UTC+05:30)
Instrument	BIO-QTOF	Acq Method Path	D:\Projects\REGULAR\Methods\regular.m
MS Type	QTOF	Acq SW Version	6500 series Q-TOF (12.1.98.0)
Inj Vol (µl)	3	IRM Status	Success
Sample Position	P2-D8	DA Method Path	D:\Projects\Instrument_Verification\Methods\default.m
Plate Position		Target Source Path	
Acq Operator	SYSTEM (SYSTEM)	Result Summary	1 qualified (1 targets)

Sample Chromatograms



Compound Summary

Cpd	Name	Formula	CAS	RT	Mass	Mass (Tgt)	Diff (Tgt, ppm)	Score	Algorithm
1		C25 H25 Br N O2 S		1.070	482.0791	482.0789	0.34	70.44	FBF

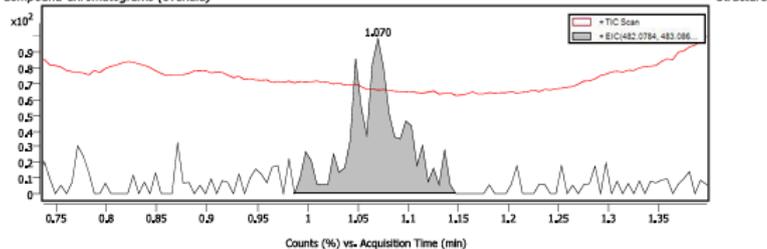
Compound Details

Cpd 1: C25 H25 Br N O2 S

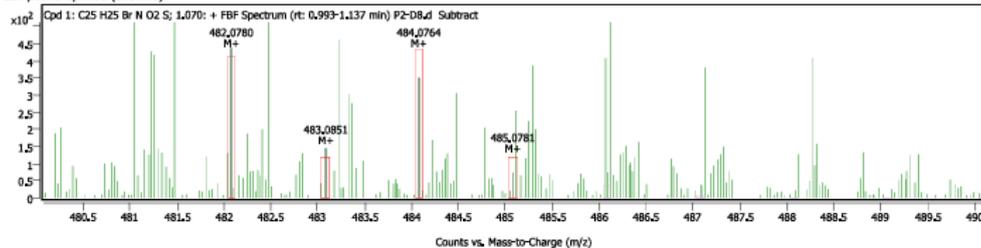
Name	Formula	RT	RI	Mass	Diff (Tgt, ppm)	CAS	ID Source	Score	Algorithm
	C25 H25 Br N O2 S	1.070		482.0791	0.34		FBF	70.44	FBF

Species	m/z	Score (Tgt)	Score (Lib)	Score (DB)	Score (MFG)	Score (RT)
M+	482.0780	70.44				

Compound Chromatograms (overlaid)



Compound Spectra (overlaid)

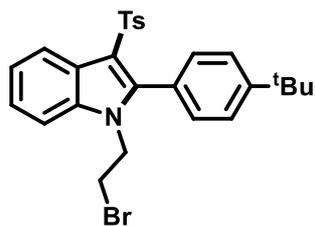


Compound ID Table

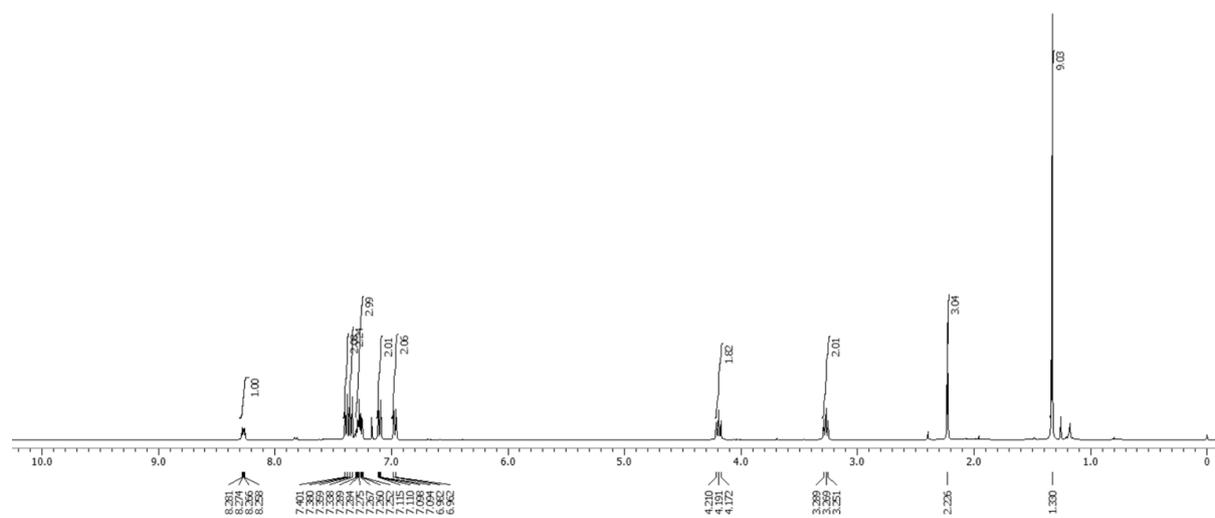
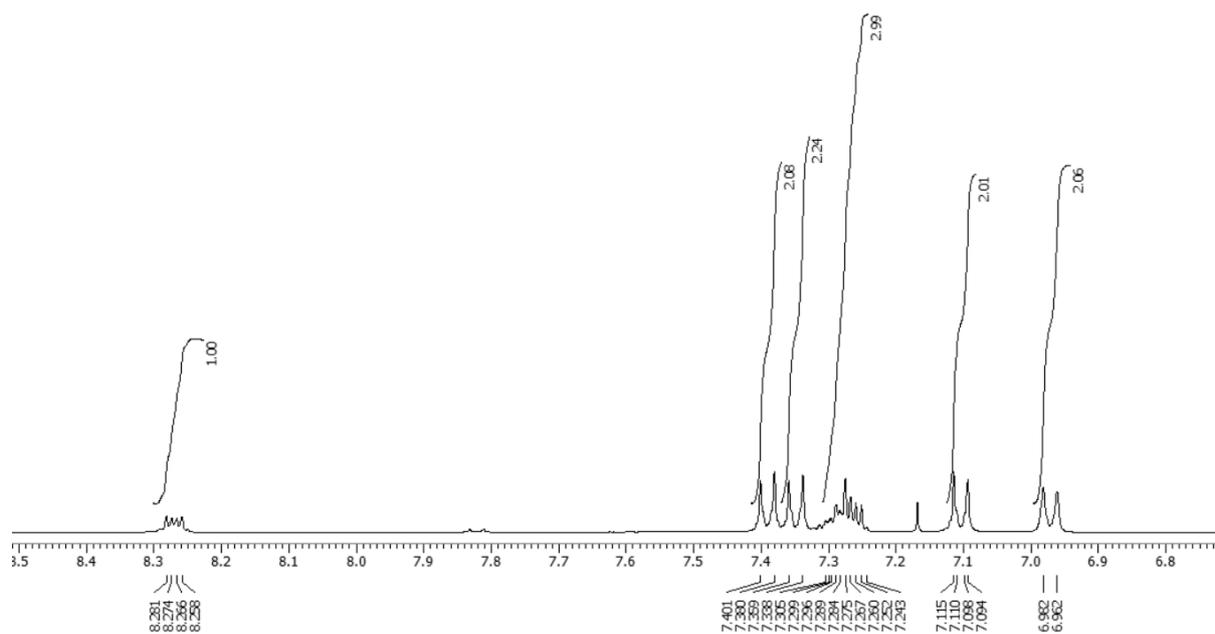
Name	Formula	Species	RT	RT DIFF	Mass	CAS	ID Source	Score	Score (Lib)	Score (Tgt)
	C25 H25 Br N O2 S	M+	1.070		482.0791		FBF	70.44		70.44

MassHunter Qual 12.0
(End of Report)

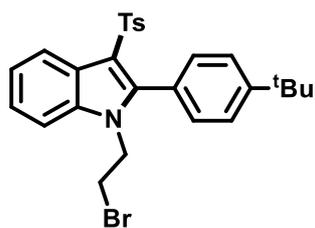
¹H NMR (400 MHz, CDCl₃)



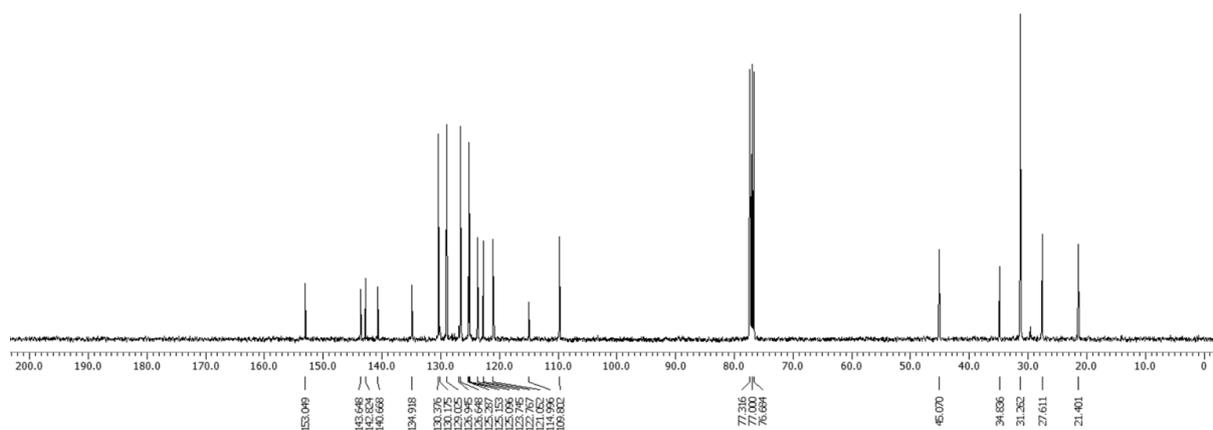
1-(2-bromoethyl)-2-(4-(tert-butylphenyl)-3-tosyl-1H-indole(**2d**)



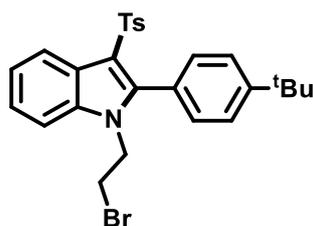
^{13}C { ^1H } NMR (100 MHz, CDCl_3)



1-(2-bromoethyl)-2-(4-tert-butylphenyl)-3-tosyl-1H-indole (**2d**)



HRMS



1-(2-bromoethyl)-2-(4-(tert-butyl)phenyl)-3-tosyl-1H-indole(2d)

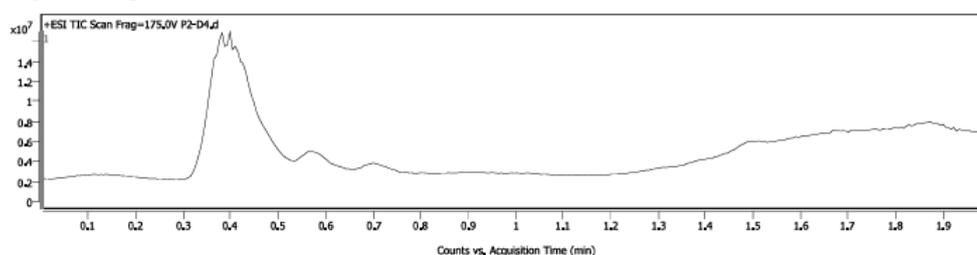
Compound Screening Report



Sample Information

Sample Name	NPS-P2A	Data File Path	D:\Projects\REGULAR\Data\P2-D4.d
Sample ID		Acq Time (Local)	13-09-2025 16:03:45 (UTC+05:30)
Instrument	BIO-QTOF	Acq Method Path	D:\Projects\REGULAR-Methods\regular.m
MS Type	QTOF	Acq SW Version	6500 series Q-TOF (12.1.96.0)
Inj Vol (µl)	3	IRM Status	Success
Sample Position	P2-D4	DA Method Path	D:\Projects\Instrument_Verification-Methods\default.m
Plate Position		Target Source Path	
Acq Operator	SYSTEM (SYSTEM)	Result Summary	1 qualified (1 targets)

Sample Chromatograms



Compound Summary

Cpd	Name	Formula	CAS	RT	Mass	Mass (Tgt)	Diff (Tgt, ppm)	Score	Algorithm
1		C27 H29 Br N O2 S		1.097	510.1098	510.1102	-0.67	99.52	FBF

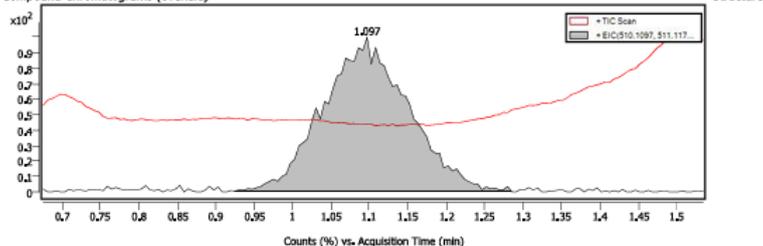
Compound Details

Cpd 1: C27 H29 Br N O2 S

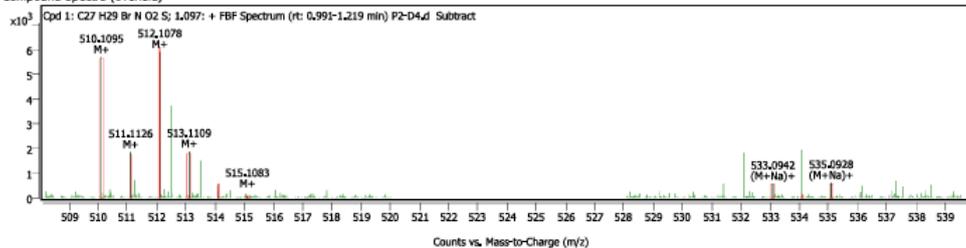
Name	Formula	RT	RI	Mass	Diff (Tgt, ppm)	CAS	ID Source	Score	Algorithm
	C27 H29 Br N O2 S	1.097		510.1098	-0.67		FBF	99.52	FBF

Species	m/z	Score (Tgt)	Score (Lib)	Score (DB)	Score (MFG)	Score (RT)
M+ (M+Na)+	510.1095	533.0942	99.52			

Compound Chromatograms (overlaid)



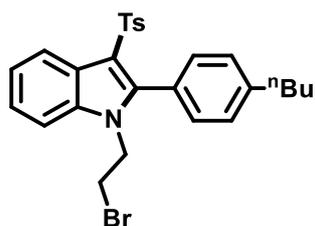
Compound Spectra (overlaid)



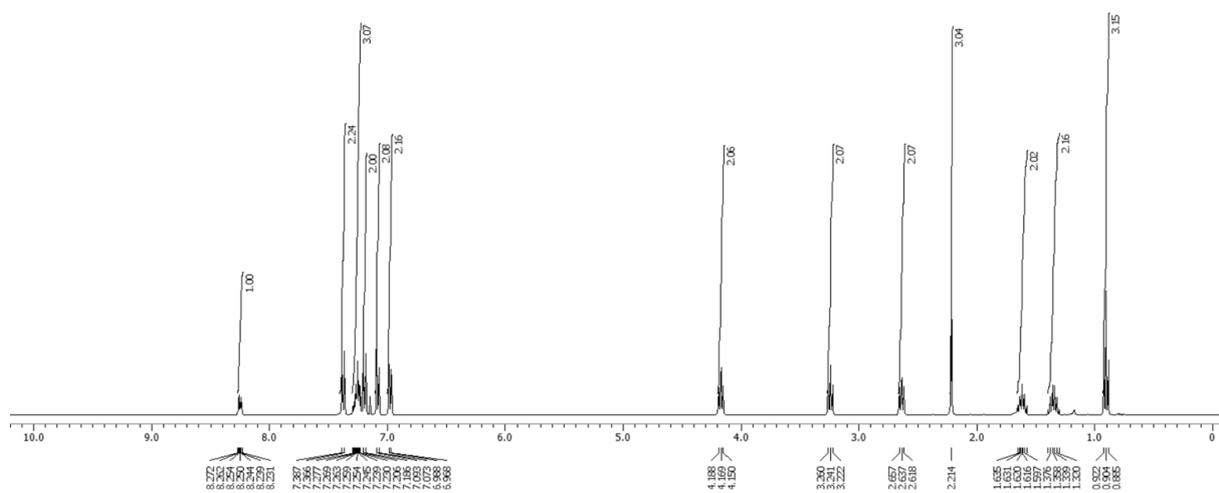
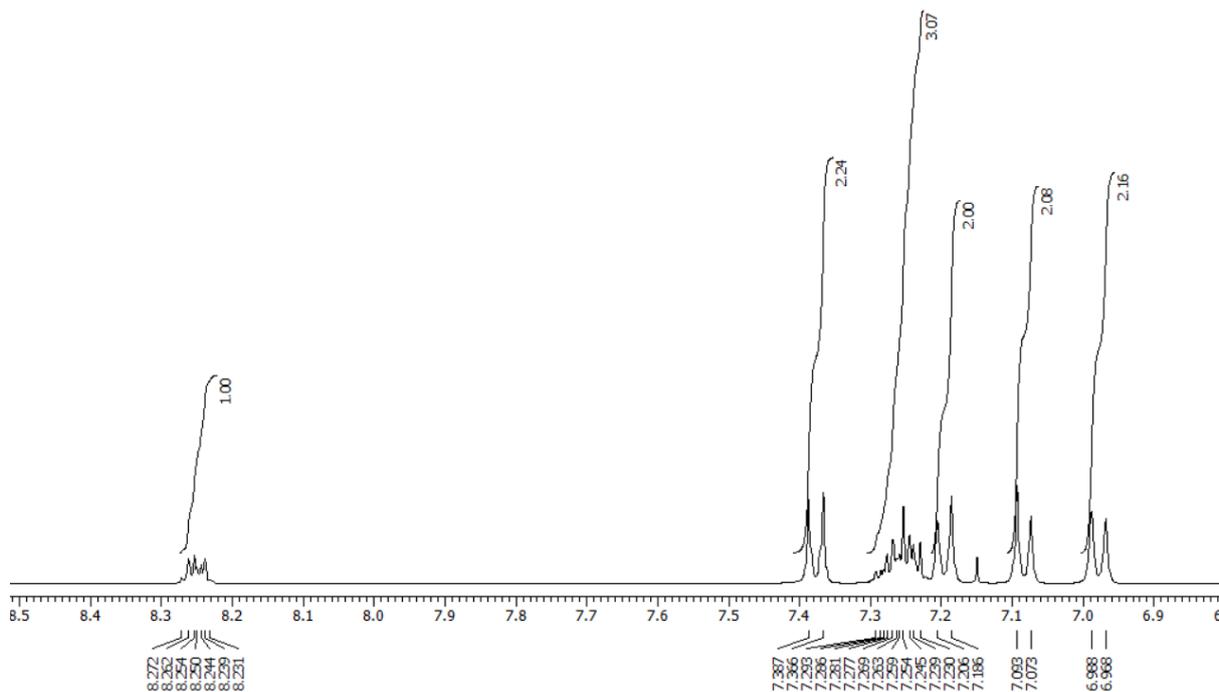
Compound ID Table

Name	Formula	Species	RT	RT Diff	Mass	CAS	ID Source	Score	Score (Lib)	Score (Tgt)
	C27 H29 Br N O2 S	M+ (M+Na)+	1.097		510.1098		FBF	99.52		99.52

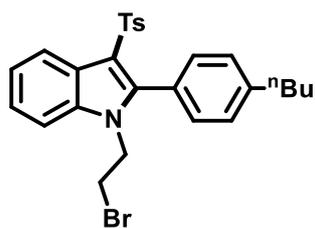
¹H NMR (400 MHz, CDCl₃)



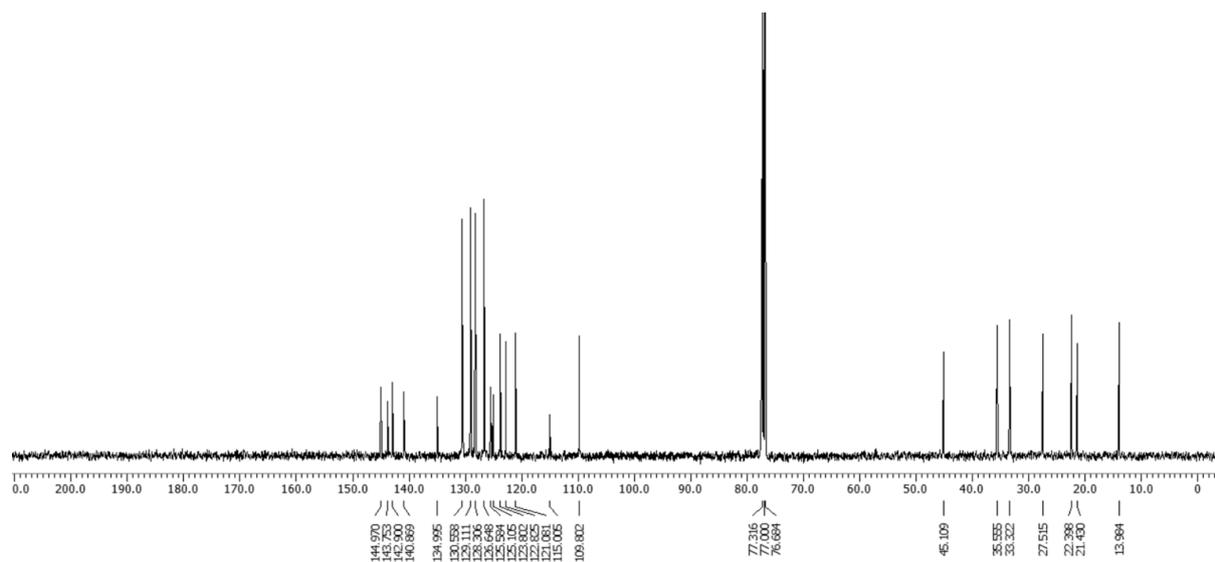
1-(2-bromoethyl)-2-(4-butylphenyl)-3-tosyl-1H-indole (**2e**)



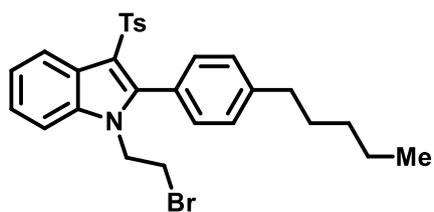
^{13}C { ^1H } NMR (100 MHz, CDCl_3)



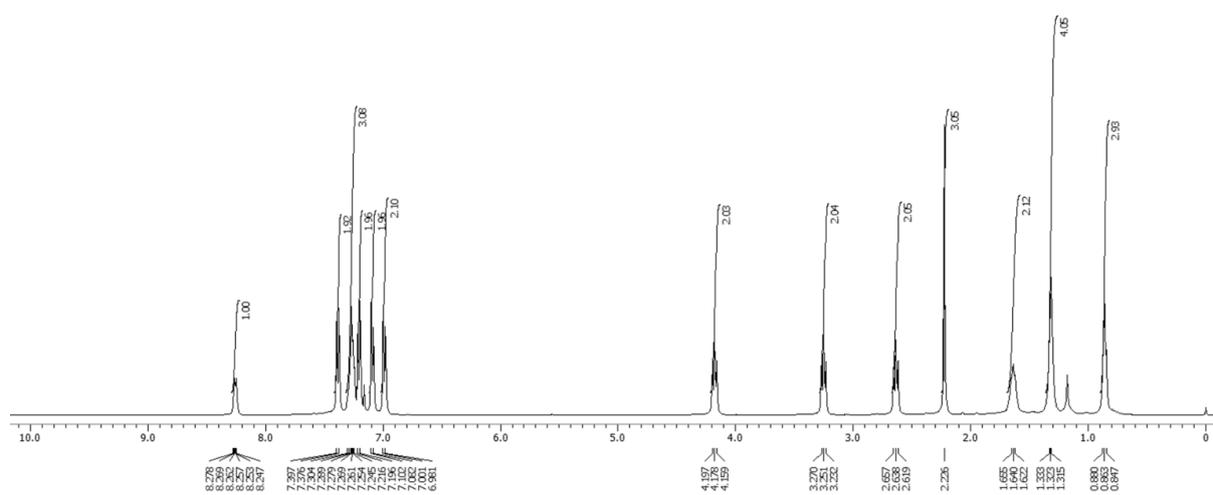
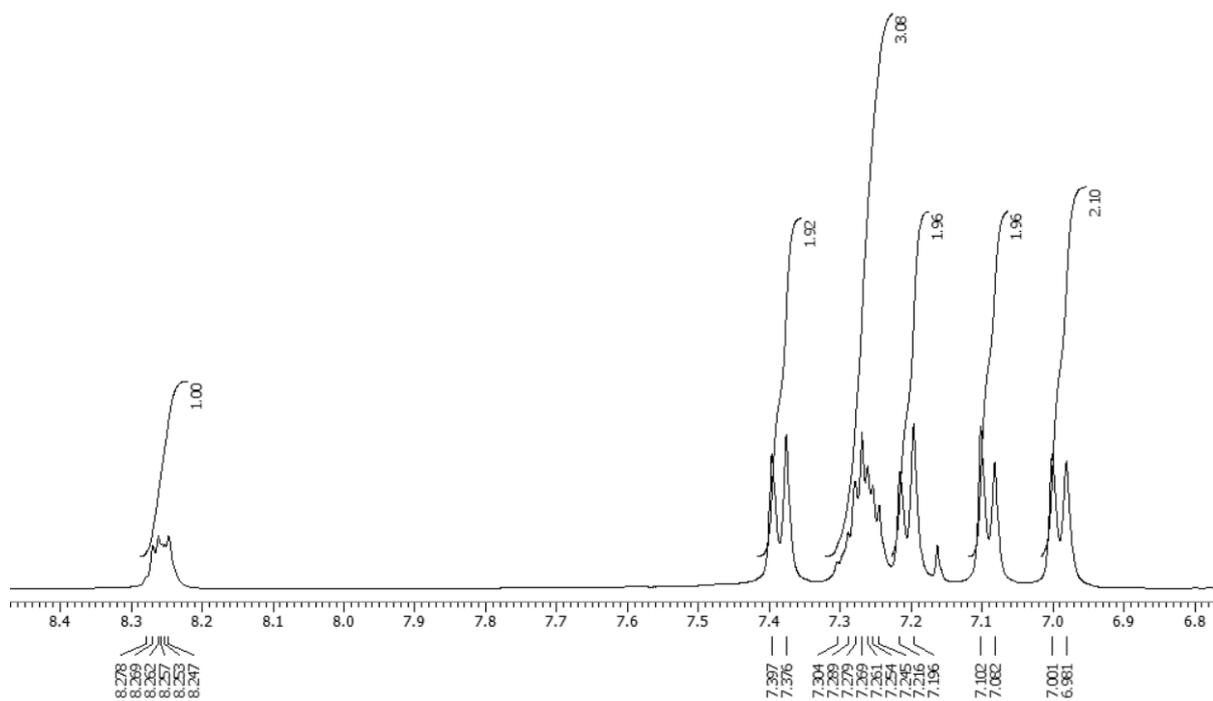
1-(2-bromoethyl)-2-(4-butylphenyl)-3-tosyl-1H-indole(2e)



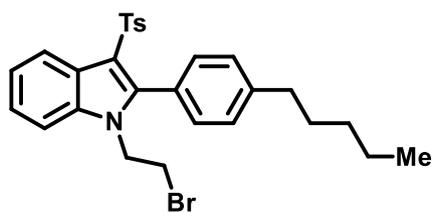
¹H NMR (400 MHz, CDCl₃)



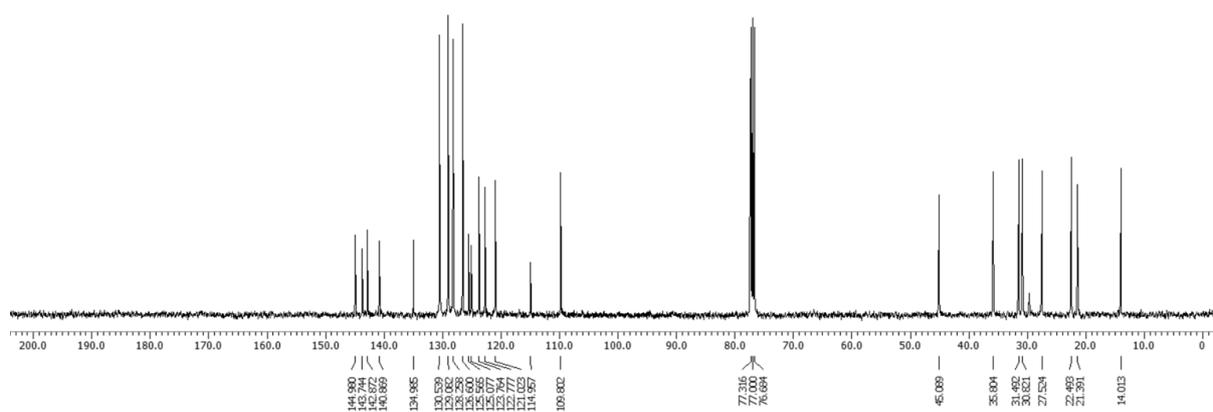
1-(2-bromoethyl)-2-(4-pentylphenyl)-3-tosyl-1H-indole(2f)



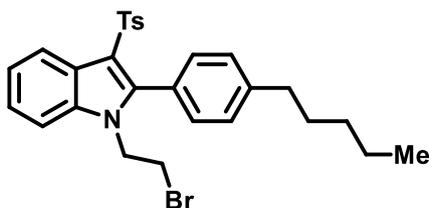
^{13}C { ^1H } NMR (100 MHz, CDCl_3)



1-(2-bromoethyl)-2-(4-pentylphenyl)-3-tosyl-1H-indole(2f)



HRMS



1-(2-bromoethyl)-2-(4-pentylphenyl)-3-tosyl-1H-indole(2f)

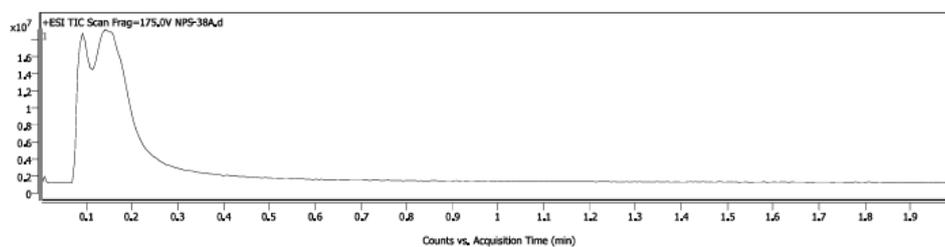
Compound Screening Report



Sample Information

Sample Name	NPS-38A	Data File Path	D:\Projects\REGULAR\Data\NPS-38A.d
Sample ID		Acq Time (Local)	14-10-2025 12:51:26 (UTC+05:30)
Instrument	BIO-QTOF	Acq Method Path	D:\Projects\REGULAR-Methods\regular.m
MS Type	QTOF	Acq SW Version	6500 series Q-TOF (12.1.96.0)
Inj Vol (µl)	4	IRM Status	Success
Sample Position	P1-B7	DA Method Path	D:\Projects\Instrument_Verification-Methods\default.m
Plate Position		Target Source Path	
Acq Operator	SYSTEM (SYSTEM)	Result Summary	1 qualified (1 targets)

Sample Chromatograms



Compound Summary

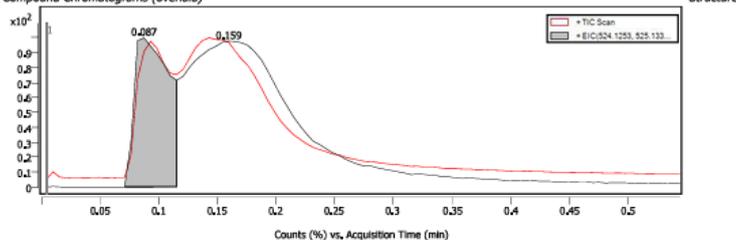
Cpd	Name	Formula	CAS	RT	Mass	Mass (Tgt)	Diff (Tgt, ppm)	Score	Algorithm
1		C28 H31 Br N O2 S		0.087	524.1295	524.1259	6.93	50.79	FBF

Compound Details

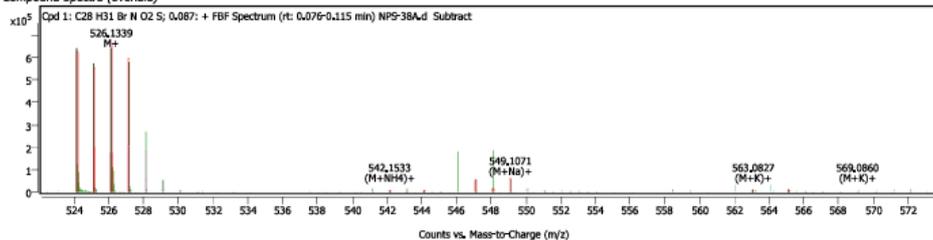
Name	Formula	RT	RI	Mass	Diff (Tgt, ppm)	CAS	ID Source	Score	Algorithm
C28 H31 Br N O2 S		0.087		524.1295	6.93		FBF	50.79	FBF

Species	m/z	Score (Tgt)	Score (Lib)	Score (DB)	Score (MFG)	Score (RT)
M+ (M+H)+	524.1351	525.1310	50.79			
(M+NH4)+	542.1533	547.1091				
(M+K)+	563.0827					

Compound Chromatograms (overlaid)



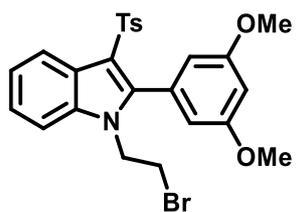
Compound Spectra (overlaid)



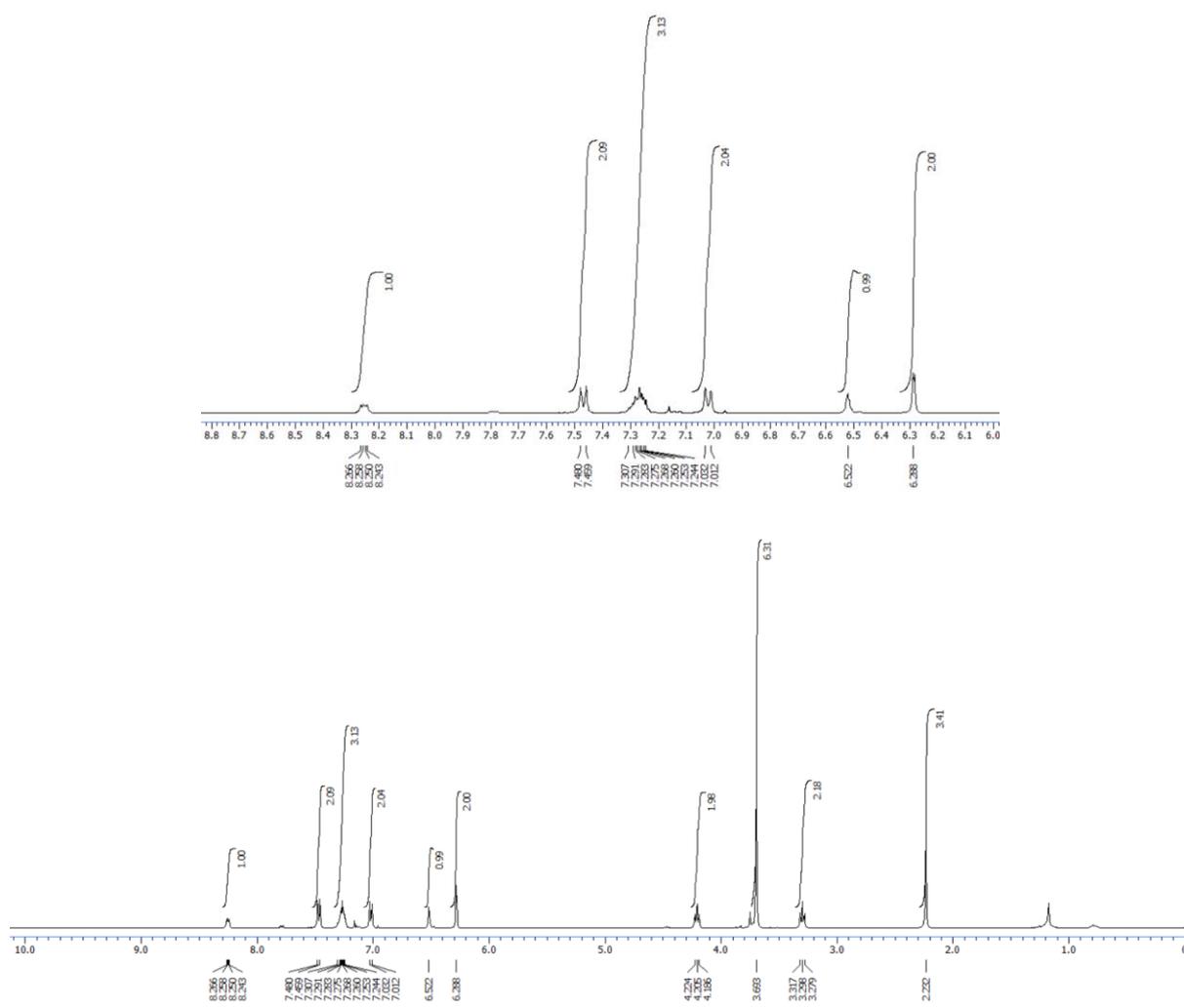
Compound ID Table

Name	Formula	Species	RT	RT Diff	Mass	CAS	ID Source	Score	Score (Lib)	Score (Tgt)
C28 H31 Br N O2 S		M+ (M+H)+ (M+NH4)+ (M+Na)+ (M+K)+	0.087		524.1295		FBF	50.79		50.79

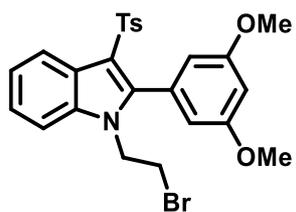
¹H NMR (400 MHz, CDCl₃)



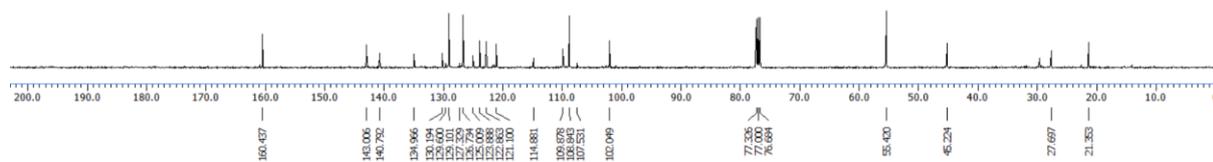
1-(2-bromoethyl)-2-(3,5-dimethoxyphenyl)-3-tosyl-1H-indole(2g)



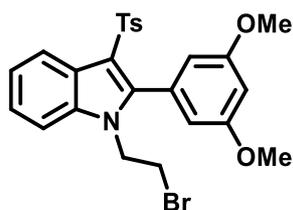
^{13}C { ^1H } NMR (100 MHz, CDCl_3)



1-(2-bromoethyl)-2-(3,5-dimethoxyphenyl)-3-tosyl-1H-indole(**2g**)



HRMS



1-(2-bromoethyl)-2-(3,5-dimethoxyphenyl)-3-tosyl-1H-indole(2g)

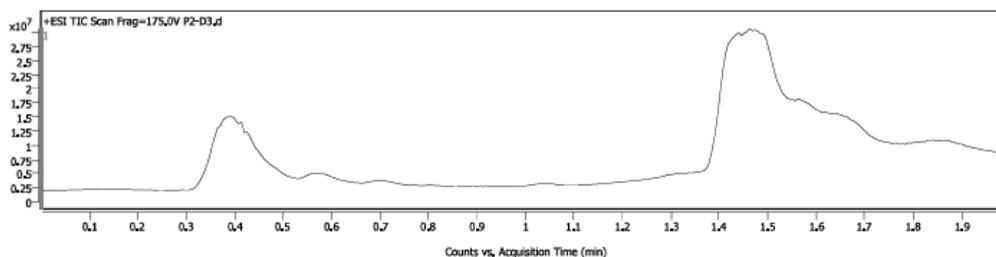
Compound Screening Report



Sample Information

Sample Name	NPS-PBA	Data File Path	D:\Projects\REGULAR\Data\P2-D3.d
Sample ID		Acq Time (Local)	13-09-2025 16:00:09 (UTC+05:30)
Instrument	BIO-QTOF	Acq Method Path	D:\Projects\REGULAR-Methods\regular.m
MS Type	QTOF	Acq SW Version	6500 series Q-TOF (12.1.96.0)
Inj Vol (µl)	3	IRM Status	Success
Sample Position	P2-D3	DA Method Path	D:\Projects\Instrument_Verification-Methods\default.m
Plate Position		Target Source Path	
Acq Operator	SYSTEM (SYSTEM)	Result Summary	1 qualified (1 targets)

Sample Chromatograms



Compound Summary

Cpd	Name	Formula	CAS	RT	Mass	Mass (Tgt)	Diff (Tgt, ppm)	Score	Algorithm
1		C25 H25 Br N O4 S		1.451	514.0721	514.0688	6.45	55.13	FBF

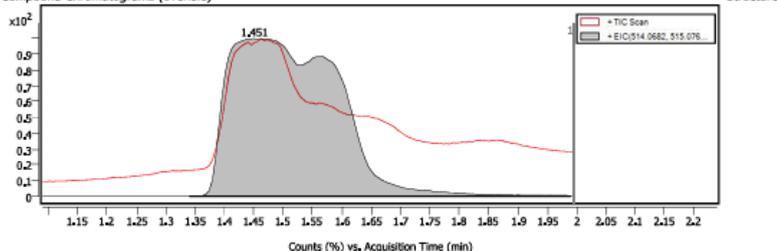
Compound Details

Cpd 1: C25 H25 Br N O4 S

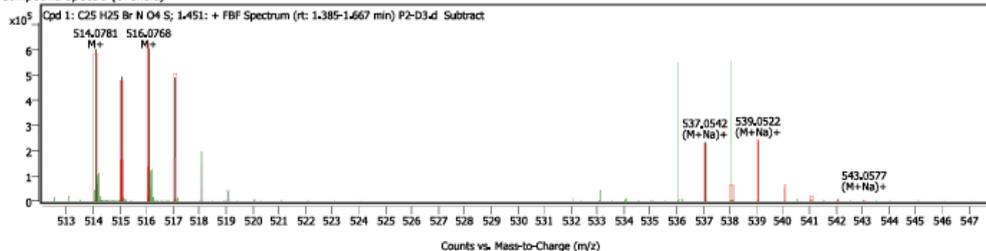
Name	Formula	RT	RI	Mass	Diff (Tgt, ppm)	CAS	ID Source	Score	Algorithm
	C25 H25 Br N O4 S	1.451		514.0721	6.45		FBF	55.13	FBF

Species	m/z	Score (Tgt)	Score (Lib)	Score (DB)	Score (MFG)	Score (RT)
M+ (M+H)+	514.0781	515.0744	55.13			
(M+Na)+	537.0542					

Compound Chromatograms (overlaid)



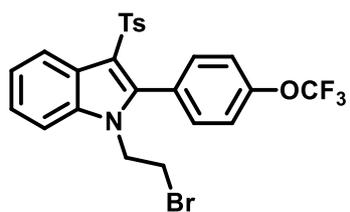
Compound Spectra (overlaid)



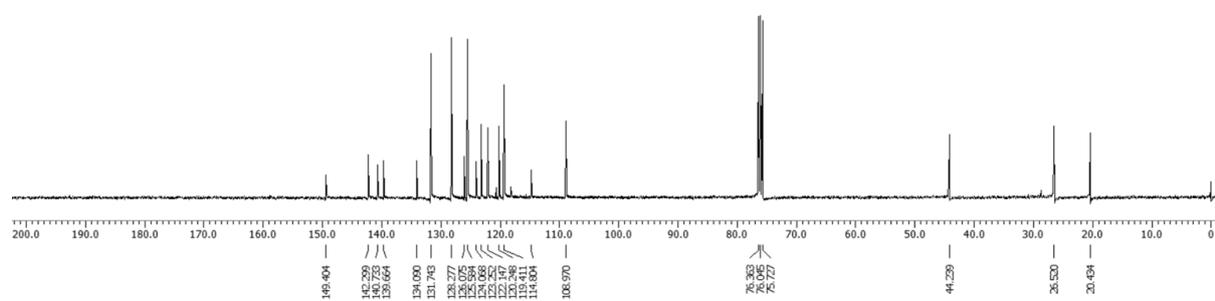
Compound ID Table

Name	Formula	Species	RT	RT Diff	Mass	CAS	ID Source	Score	Score (Lib)	Score (Tgt)
	C25 H25 Br N O4 S	M+ (M+H)+ (M+Na)+	1.451		514.0721		FBF	55.13		55.13

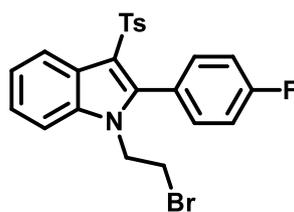
^{13}C { ^1H } NMR (100 MHz, CDCl_3)



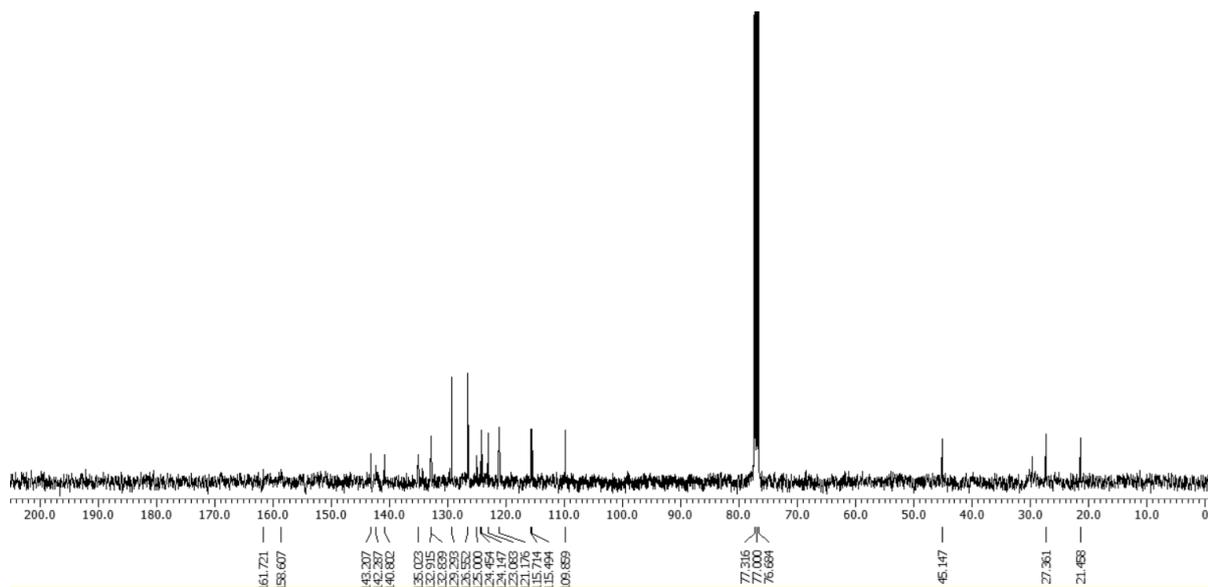
1-(2-bromoethyl)-3-tosyl-2-(4-(trifluoromethoxy)phenyl)-1H-indole (**2h**)



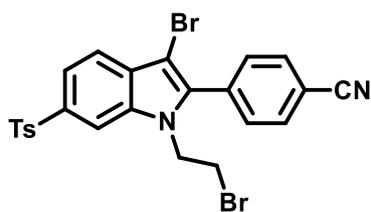
^{13}C { ^1H } NMR (100 MHz, CDCl_3)



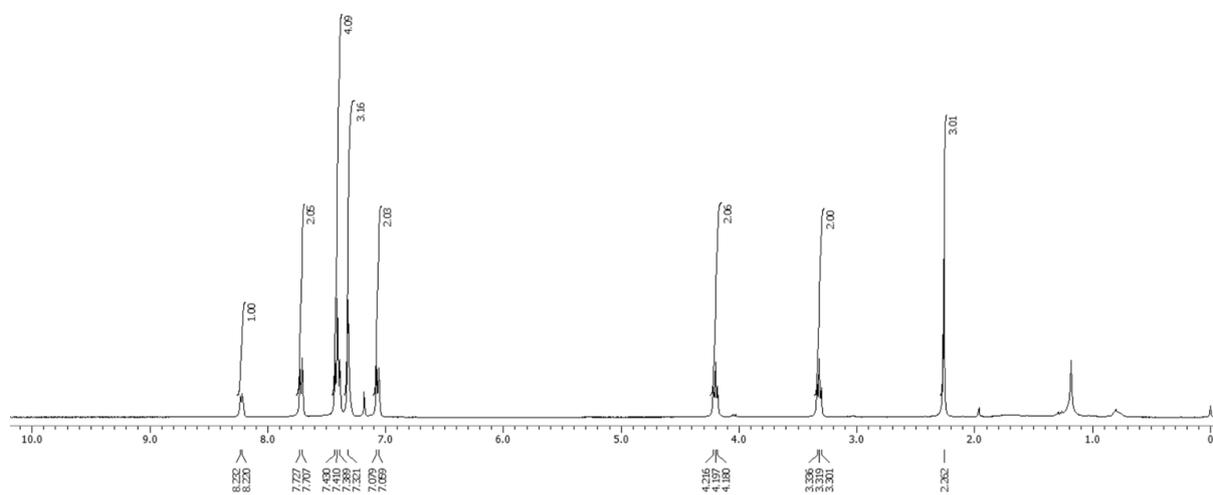
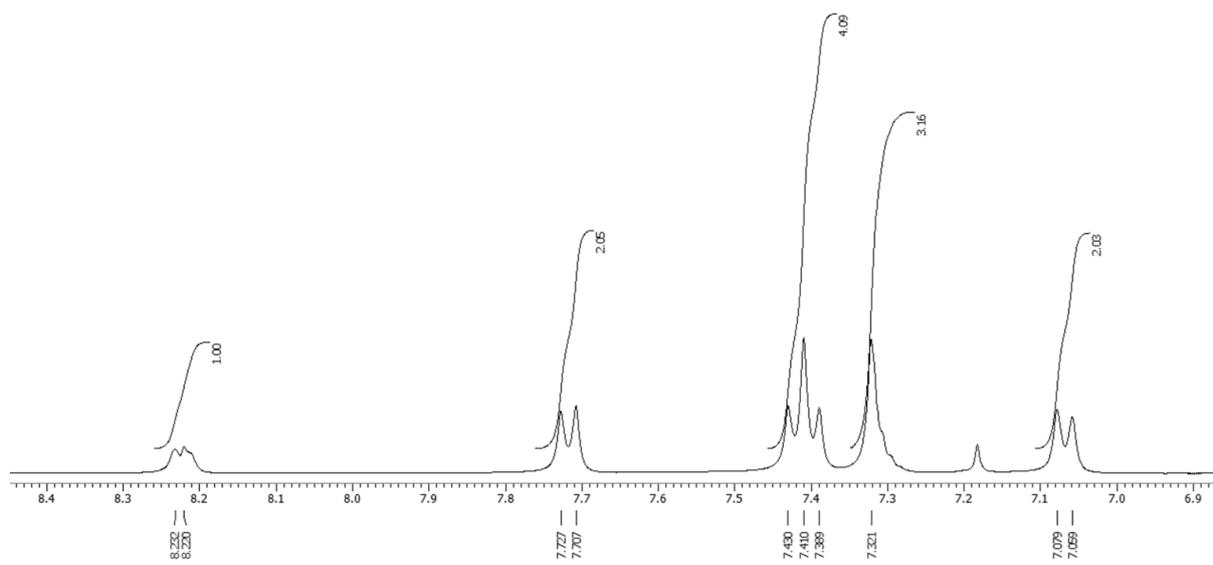
1-(2-bromoethyl)-2-(4-fluorophenyl)-3-tosyl-1H-indole (**2i**)



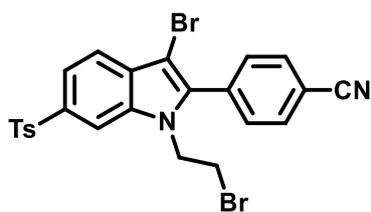
¹H NMR (400 MHz, CDCl₃)



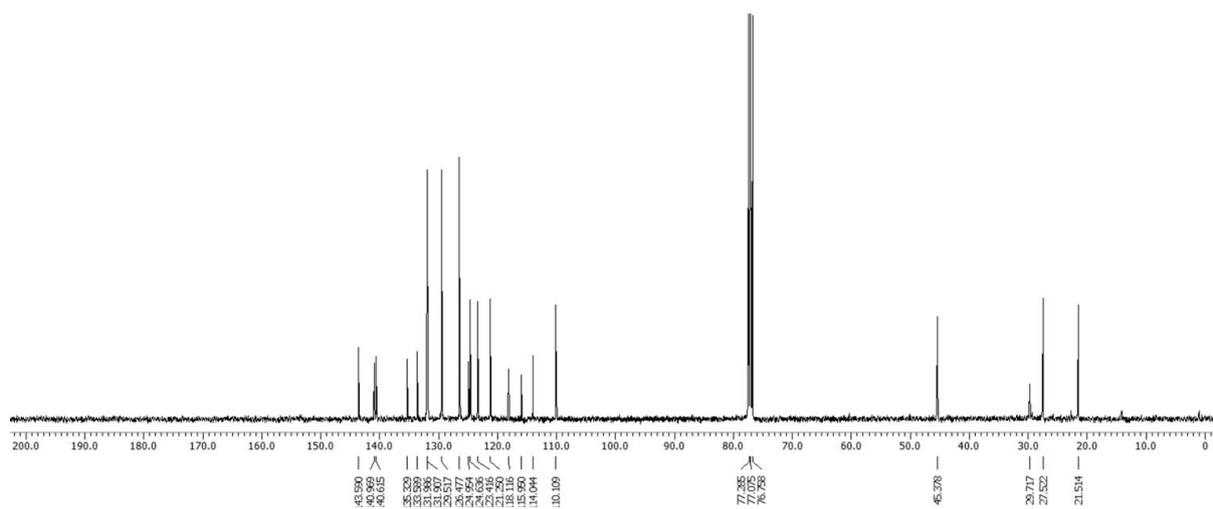
4-(1-(2-bromoethyl)-3-tosyl-1H-indol-2-yl)benzonitrile (**2j**)



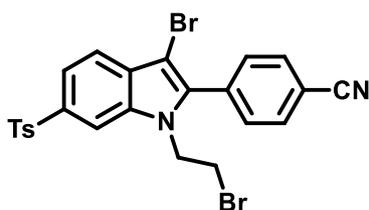
^{13}C { ^1H } NMR (100 MHz, CDCl_3)



4-(1-(2-bromoethyl)-3-tosyl-1H-indol-2-yl)benzonitrile (**2j**)



HRMS



4-(1-(2-bromoethyl)-3-tosyl-1H-indol-2-yl)benzonitrile (**2j**)

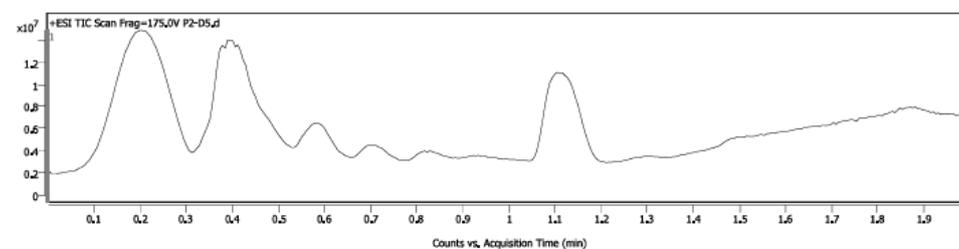
Compound Screening Report



Sample Information

Sample Name	NPS-P13A	Data File Path	D:\Projects\REGULAR\Data\P2-D5.d
Sample ID		Acq Time (Local)	13-09-2025 16:07:20 (UTC+05:30)
Instrument	BIO-QTOF	Acq Method Path	D:\Projects\REGULAR-Methods\regular.m
MS Type	QTOF	Acq SW Version	6500 series Q-TOF (12.1.98.0)
Inj Vol (µl)	3	IRM Status	Success
Sample Position	P2-D5	DA Method Path	D:\Projects\Instrument_Verification-Methods\default.m
Plate Position		Target Source Path	
Acq Operator	SYSTEM (SYSTEM)	Result Summary	1 qualified (1 targets)

Sample Chromatograms



Compound Summary

Cpd Name	Formula	CAS	RT	Mass	Mass (Tgt)	Diff (Tgt, ppm)	Score	Algorithm
1	C ₂₄ H ₂₀ BrN ₂ O ₂ S		1.105	479.0440	479.0429	2.27	84.75	FBF

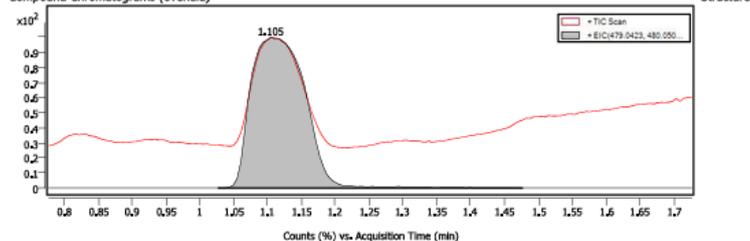
Compound Details

Cpd 1: C₂₄H₂₀BrN₂O₂S

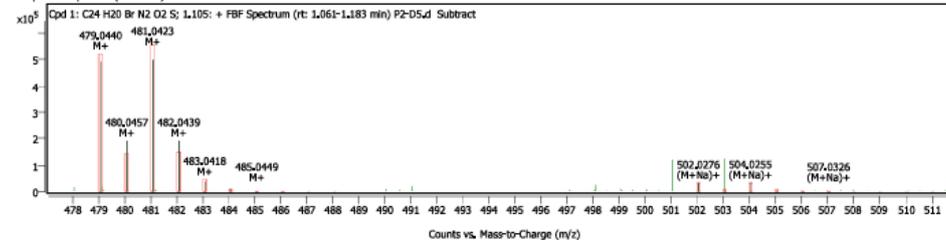
Name	Formula	RT	RI	Mass	Diff (Tgt, ppm)	CAS	ID Source	Score	Algorithm
C ₂₄ H ₂₀ BrN ₂ O ₂ S		1.105		479.0440	2.27		FBF	84.75	FBF

Species	m/z	Score (Tgt)	Score (Lib)	Score (DB)	Score (MFG)	Score (RT)
M+ (M+Na)+	479.0440 502.0276	84.75				

Compound Chromatograms (overlaid)



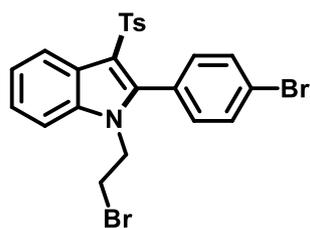
Compound Spectra (overlaid)



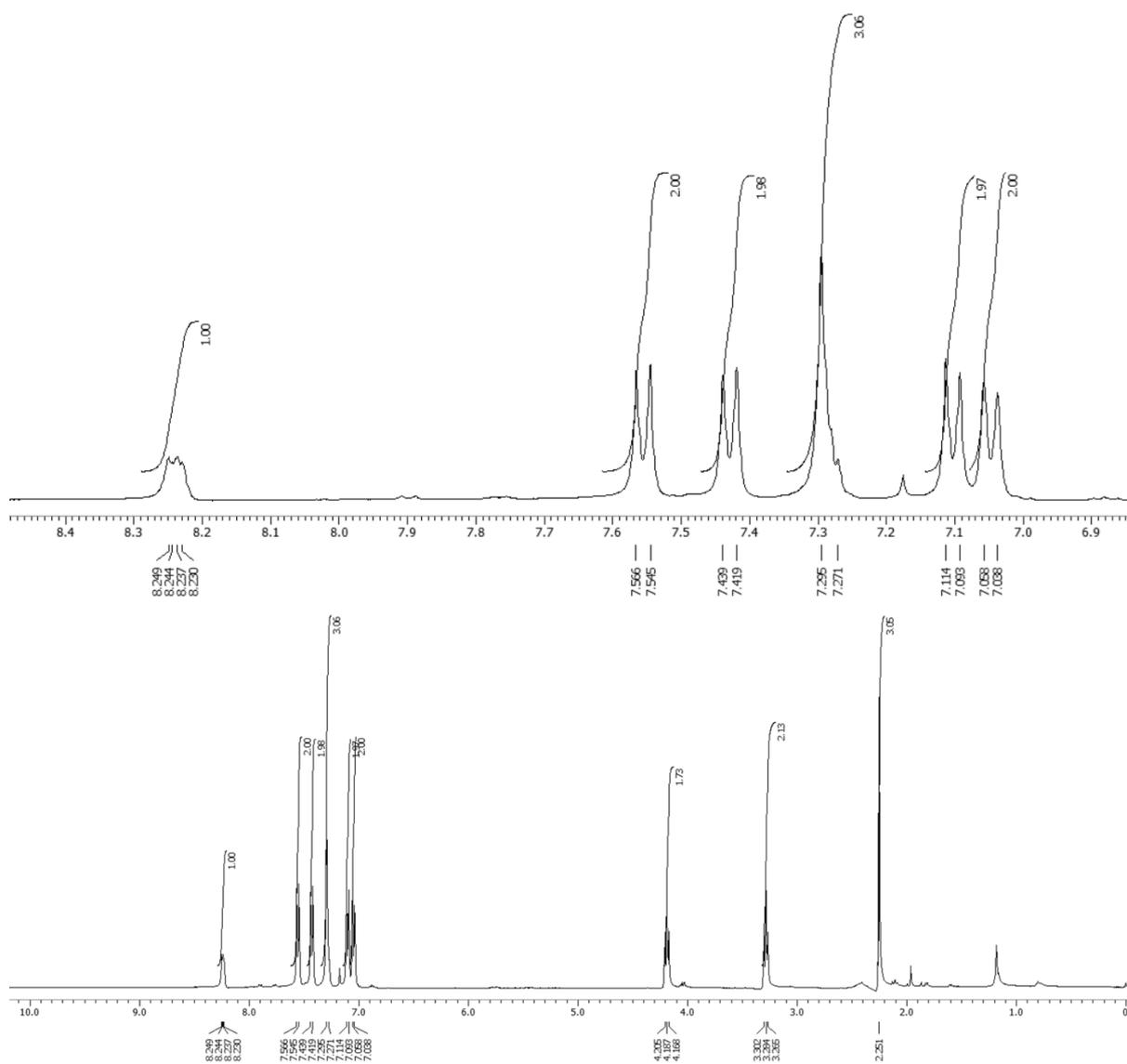
Compound ID Table

Name	Formula	Species	RT	RT Diff	Mass	CAS	ID Source	Score	Score (Lib)	Score (Tgt)
	C ₂₄ H ₂₀ BrN ₂ O ₂ S	R+ (M+Na)+	1.105		479.0440		FBF	84.75		84.75

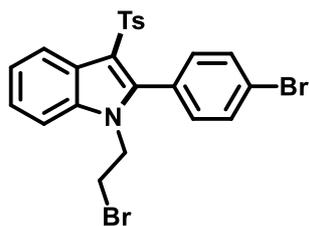
¹H NMR (400 MHz, CDCl₃)



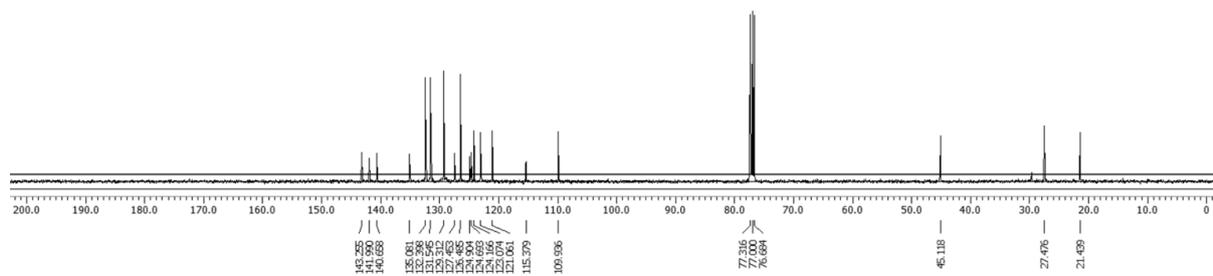
1-(2-bromoethyl)-2-(4-bromophenyl)-3-tosyl-1H-indole (2k).



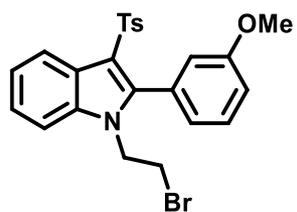
^{13}C { ^1H } NMR (100 MHz, CDCl_3)



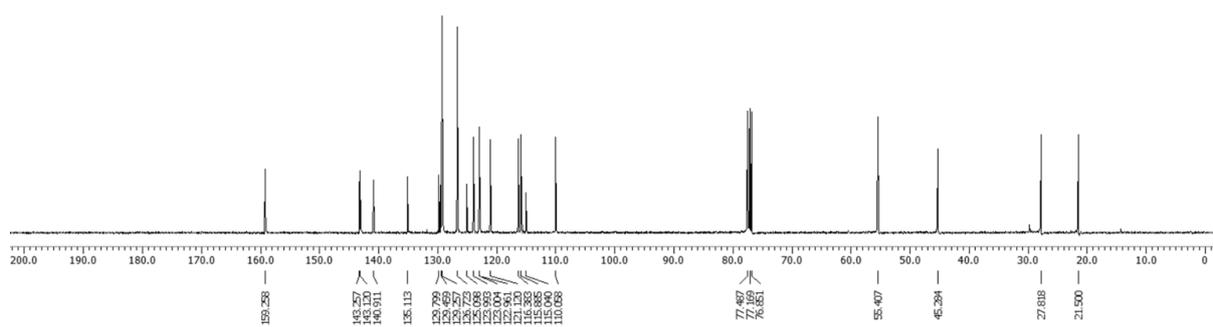
1-(2-bromoethyl)-2-(4-bromophenyl)-3-tosyl-1H-indole (**2k**).



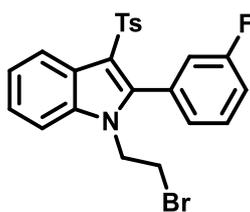
^{13}C { ^1H } NMR (100 MHz, CDCl_3)



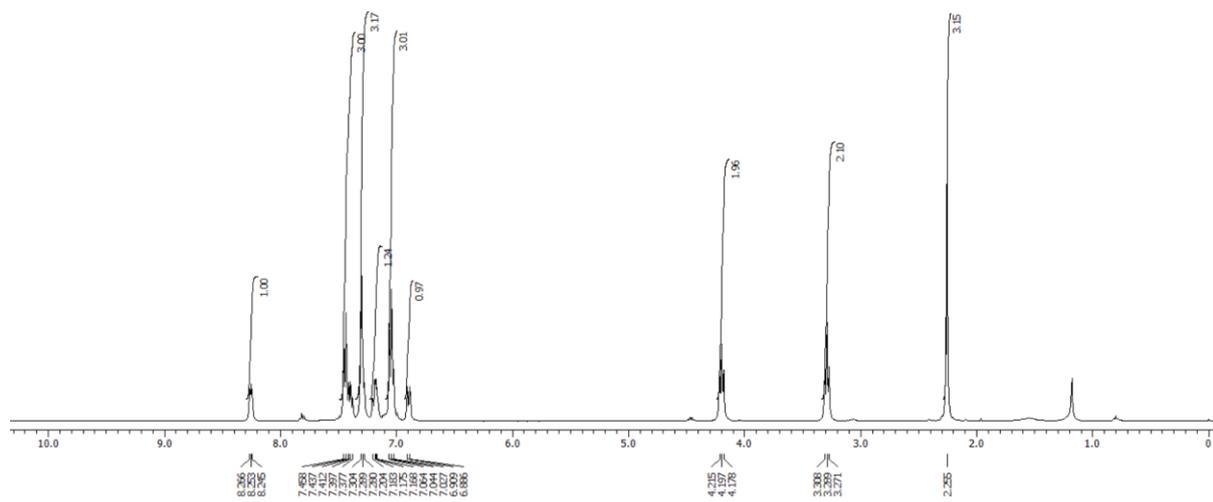
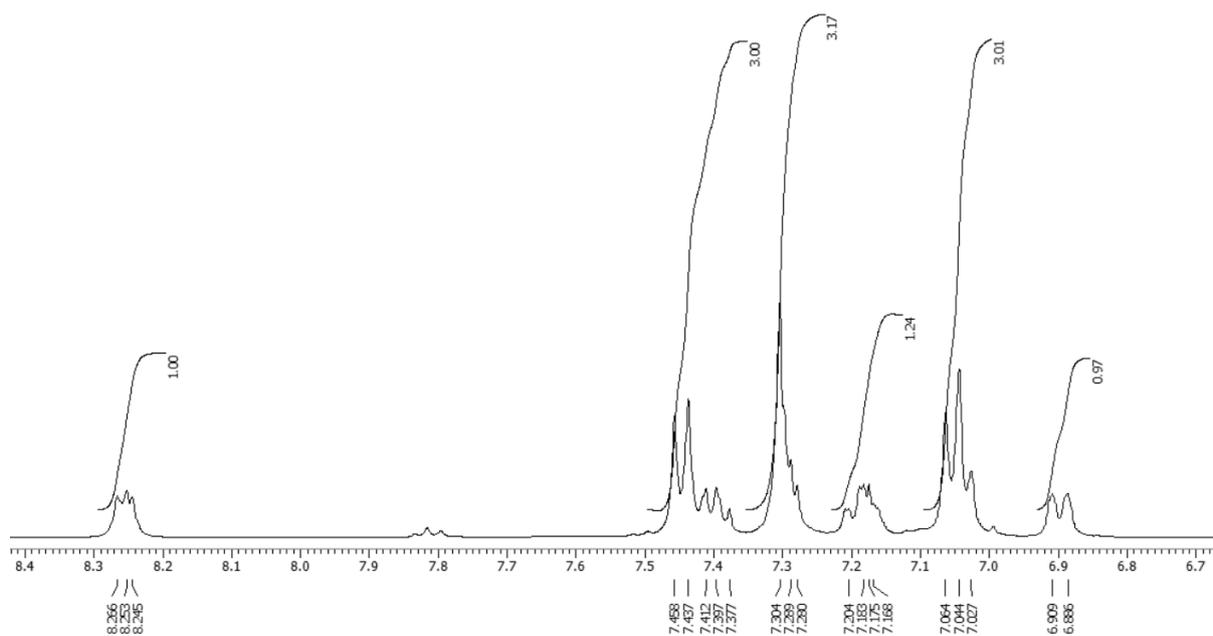
1-(2-bromoethyl)-2-(3-methoxyphenyl)-3-tosyl-1H-indole (**21**).



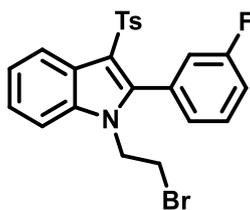
¹H NMR (400 MHz, CDCl₃)



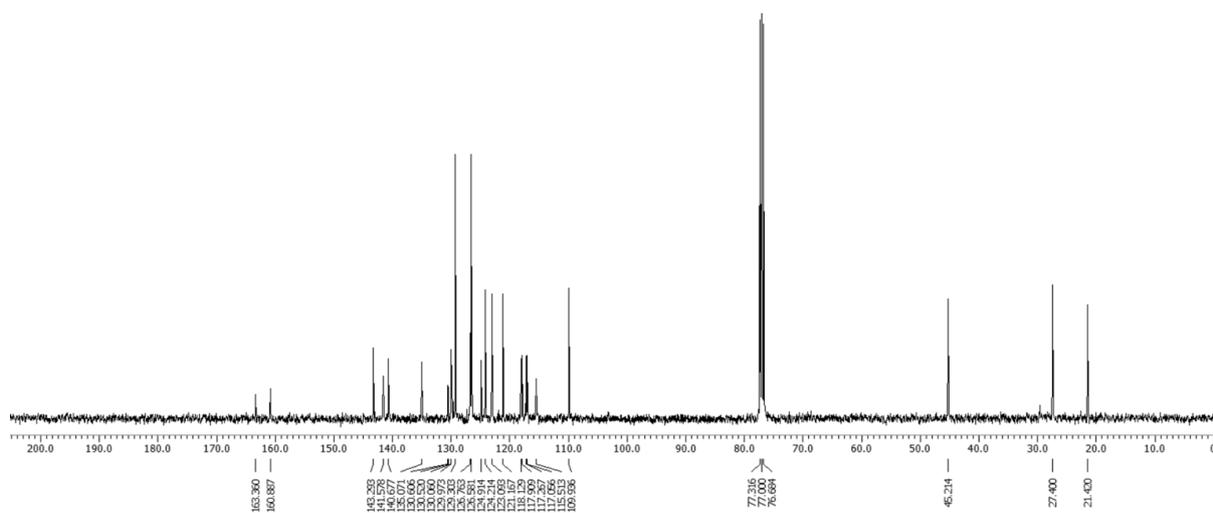
1-(2-bromoethyl)-2-(3-fluorophenyl)-3-tosyl-1H-indole (**2m**).



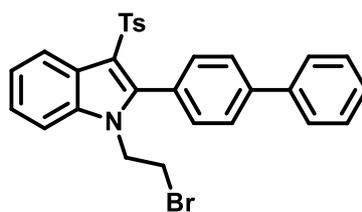
^{13}C { ^1H } NMR (100 MHz, CDCl_3)



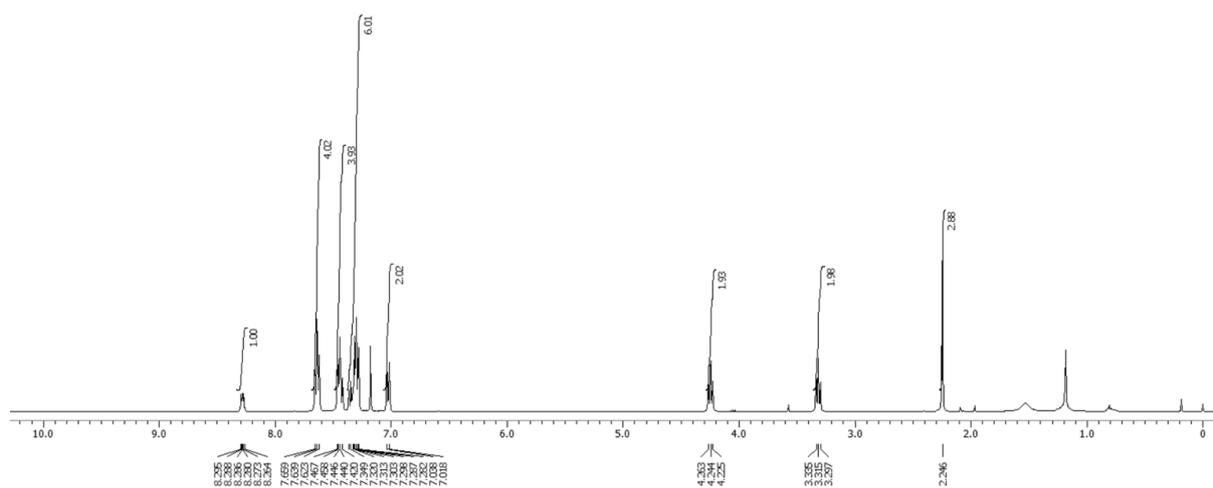
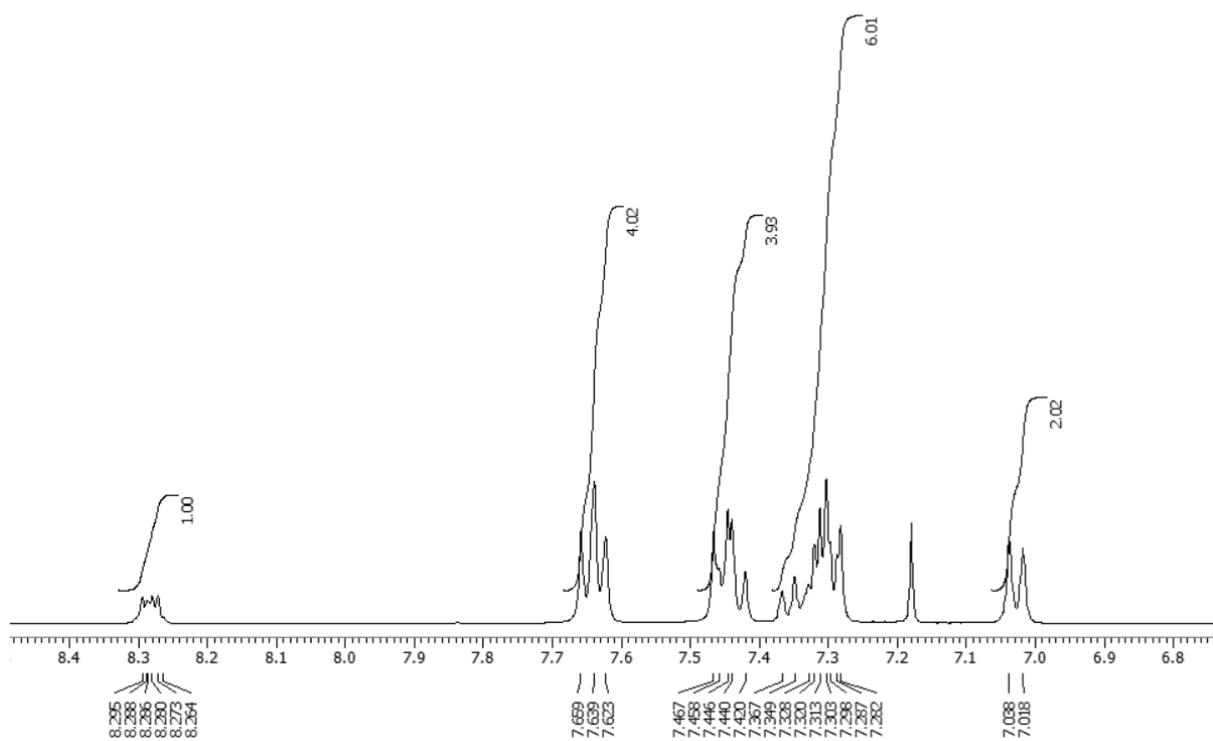
1-(2-bromoethyl)-2-(3-fluorophenyl)-3-tosyl-1H-indole (**2m**).



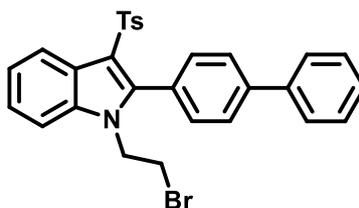
¹H NMR (400 MHz, CDCl₃)



2-([1,1'-biphenyl]-4-yl)-1-(2-bromoethyl)-3-tosyl-1H-indole (**2n**)



HRMS



2-([1,1'-biphenyl]-4-yl)-1-(2-bromoethyl)-3-tosyl-1H-indole (**2n**)

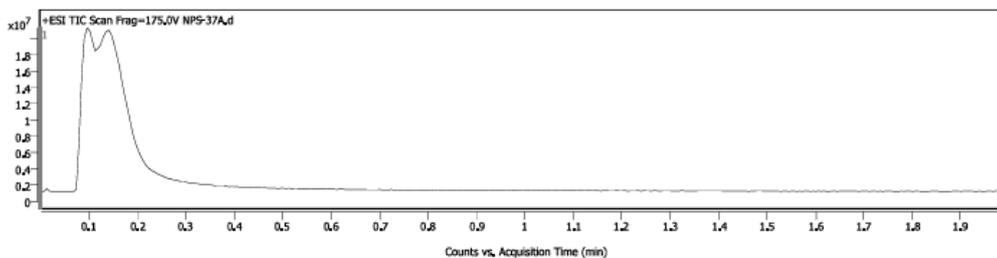
Compound Screening Report



Sample Information

Sample Name	NPS-37A	Data File Path	D:\Projects\REGULAR\Data\NPS-37A.d
Sample ID		Acq Time (Local)	14-10-2025 12:16:46 (UTC+05:30)
Instrument	BIO-QTOF	Acq Method Path	D:\Projects\REGULAR-Methods\regular.m
MS Type	QTOF	Acq SW Version	6500 series Q-TOF (12.1.98.0)
Inj Vol (µl)	4	IRM Status	Success
Sample Position	P1-AS	DA Method Path	D:\Projects\Instrument_Verification-Methods\default.Lm
Plate Position		Target Source Path	
Acq Operator	SYSTEM (SYSTEM)	Result Summary	1 qualified (1 targets)

Sample Chromatograms



Compound Summary

Cpd	Name	Formula	CAS	RT	Mass	Mass (Tgt)	Diff (Tgt, ppm)	Score	Algorithm
1		C29 H25 Br N O2 S		0.152	530.0794	530.0789	0.67	82.09	FBF

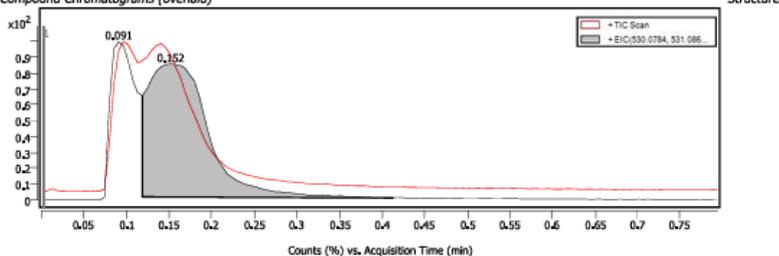
Compound Details

Cpd 1: C29 H25 Br N O2 S

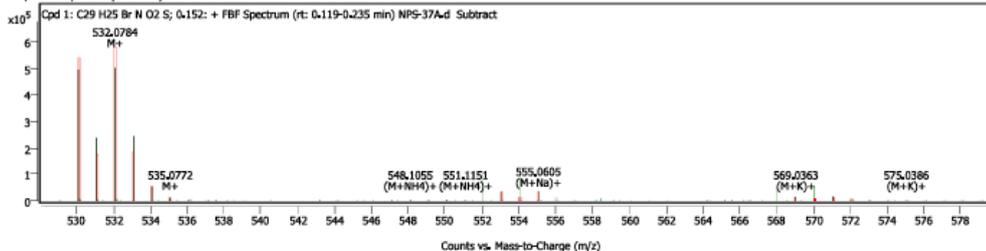
Name	Formula	RT	RI	Mass	Diff (Tgt, ppm)	CAS	ID Source	Score	Algorithm
C29 H25 Br N O2 S		0.152		530.0794	0.67		FBF	82.09	FBF

Species	m/z	Score (Tgt)	Score (Lib)	Score (DB)	Score (MFG)	Score (RT)
M+ (M+NH4)+	530.0798 548.1055	82.09				
(M+Na)+ (M+K)+	553.0626 569.0363					

Compound Chromatograms (overlaid)



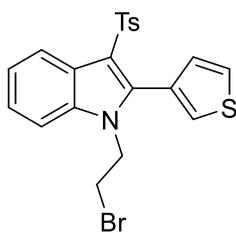
Compound Spectra (overlaid)



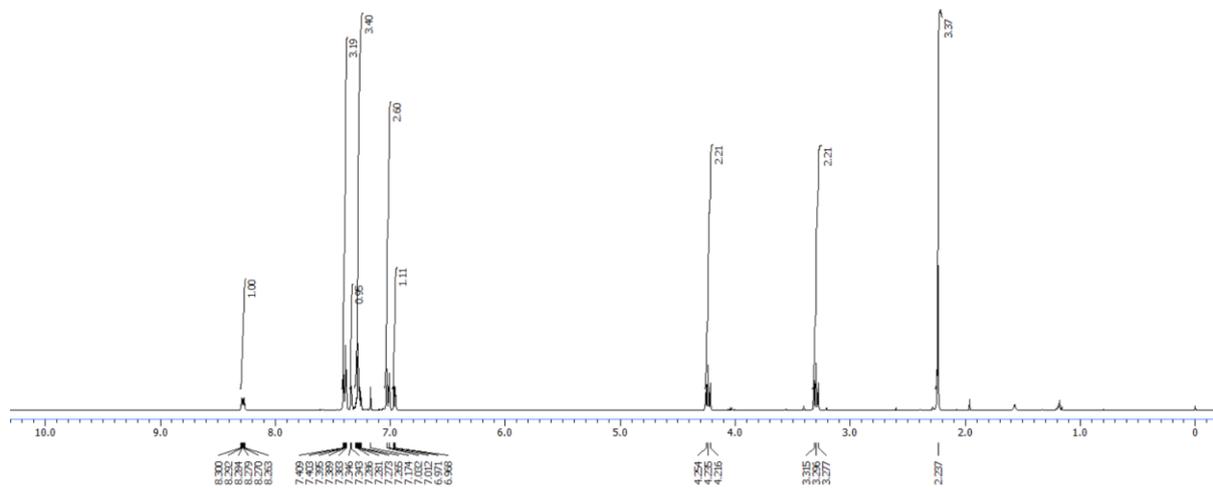
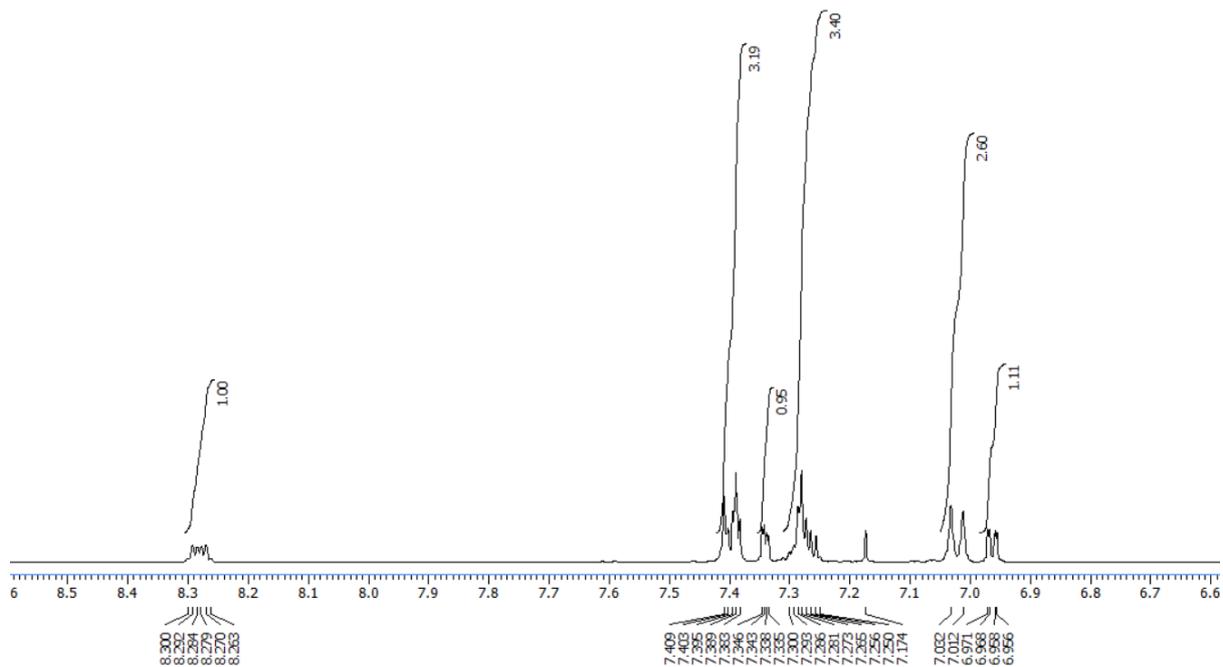
Compound ID Table

Name	Formula	Species	RT	RT Diff	Mass	CAS	ID Source	Score	Score (Lib)	Score (Tgt)
	C29 H25 Br N O2 S	M+ (M+NH4)+ (M+Na)+ (M+K)+	0.152		530.0794		FBF	82.09		82.09

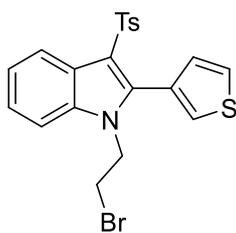
¹H NMR (400 MHz, CDCl₃)



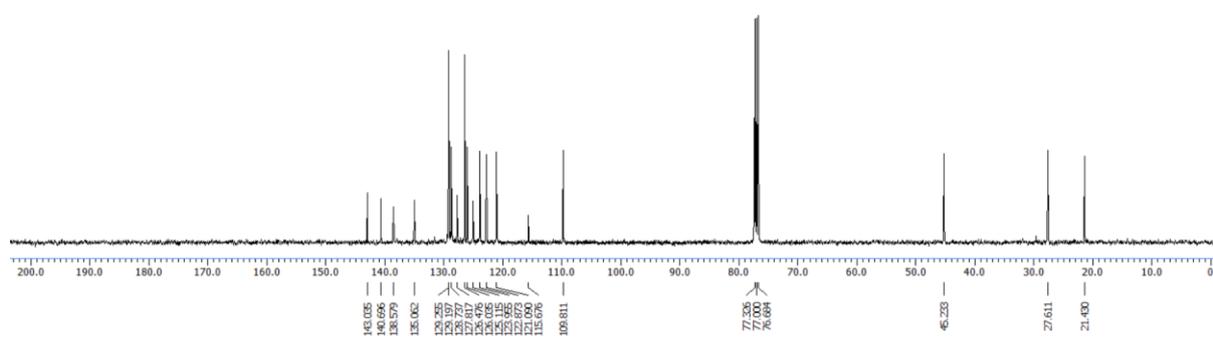
1-(2-bromoethyl)-2-(thiophen-3-yl)-3-tosyl-1H-indole (**2p**)



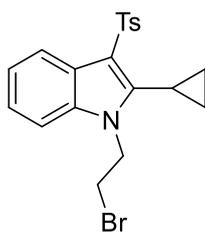
$^{13}\text{C} \{^1\text{H}\}$ NMR (100 MHz, CDCl_3)



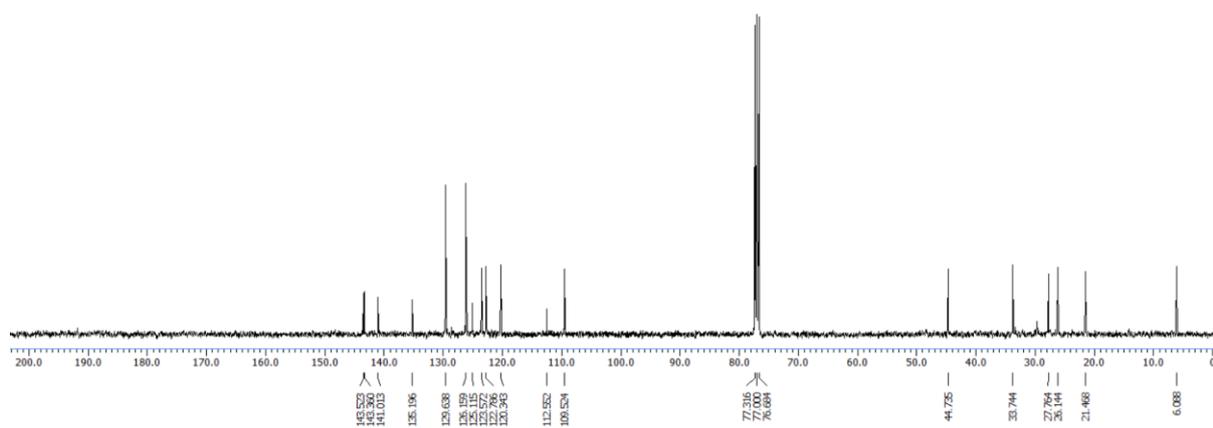
1-(2-bromoethyl)-2-(thiophen-3-yl)-3-tosyl-1H-indole (**2p**)



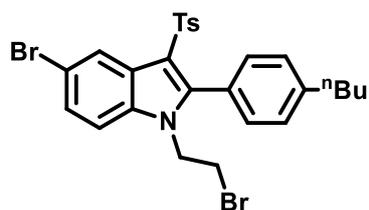
^{13}C { ^1H } NMR (100 MHz, CDCl_3)



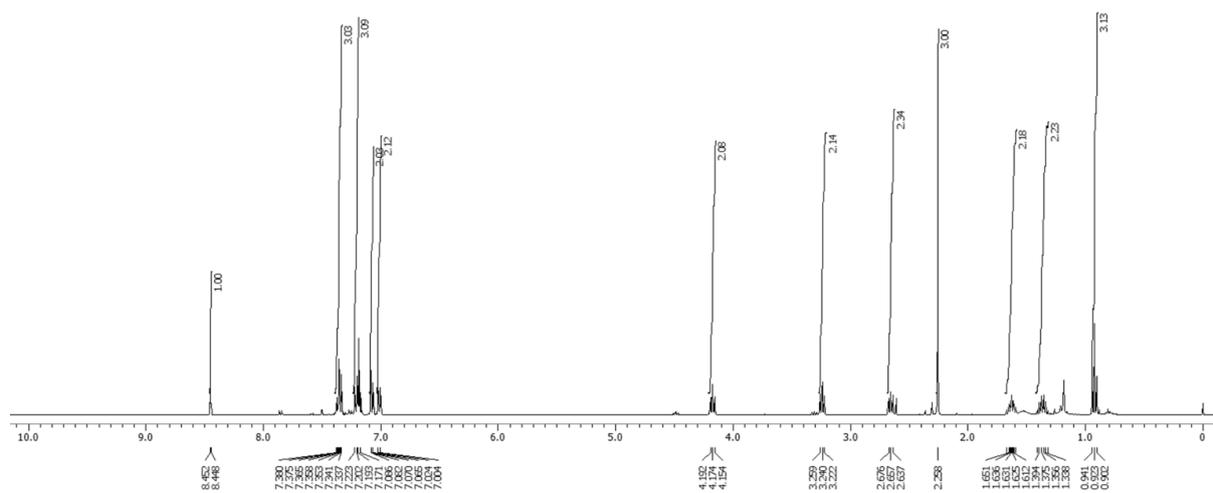
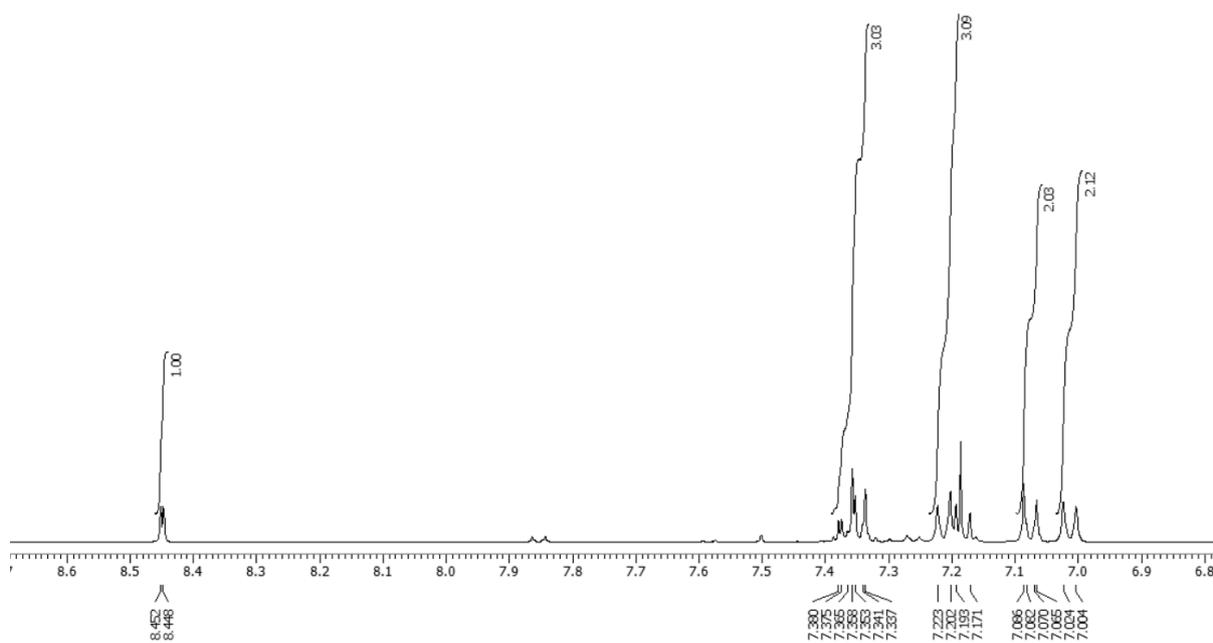
1-(2-bromoethyl)-2-cyclopropyl-3-tosyl-1H-indole (**2q**)



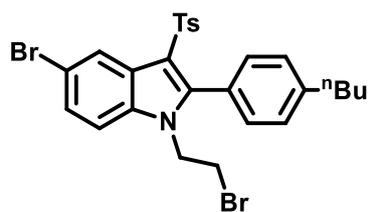
¹H NMR (400 MHz, CDCl₃)



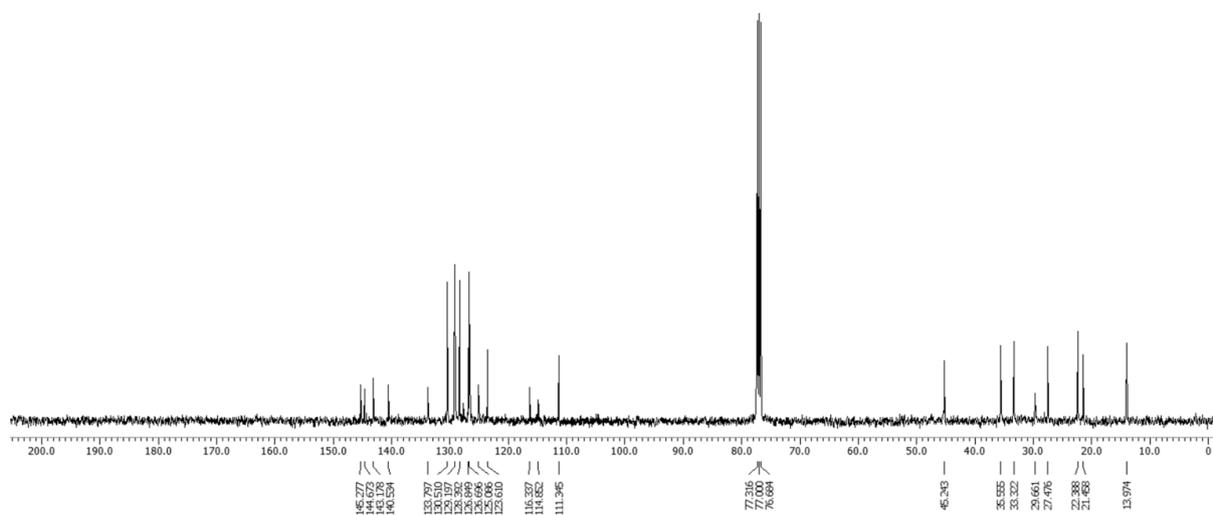
5-bromo-1-(2-bromoethyl)-2-(4-butylphenyl)-3-tosyl-1H-indole (**4a**).



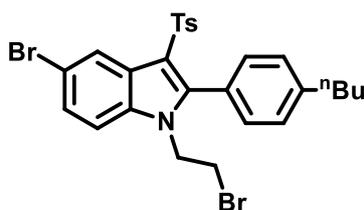
^{13}C { ^1H } NMR (100 MHz, CDCl_3)



5-bromo-1-(2-bromoethyl)-2-(4-butylphenyl)-3-tosyl-1H-indole (**4a**).



HRMS



5-bromo-1-(2-bromoethyl)-2-(4-butylphenyl)-3-tosyl-1H-indole (4a).

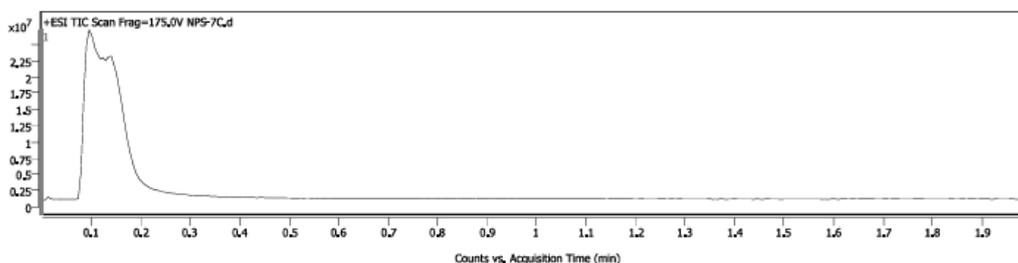
Compound Screening Report



Sample Information

Sample Name	NPS-7C	Data File Path	D:\Projects\REGULAR\Data\NPS-7C.d
Sample ID		Acq Time (Local)	14-10-2025 12:14:06 (UTC+05:30)
Instrument	BIO-QTOF	Acq Method Path	D:\Projects\REGULAR-Methods\regular.m
MS Type	QTOF	Acq SW Version	6500 series Q-TOF (12.1.98.0)
Inj Vol (µl)	4	IRM Status	Success
Sample Position	P1-A4	DA Method Path	D:\Projects\Instrument_Verification-Methods\default.m
Plate Position		Target Source Path	
Acq Operator	SYSTEM (SYSTEM)	Result Summary	1 qualified (1 targets)

Sample Chromatograms



Compound Summary

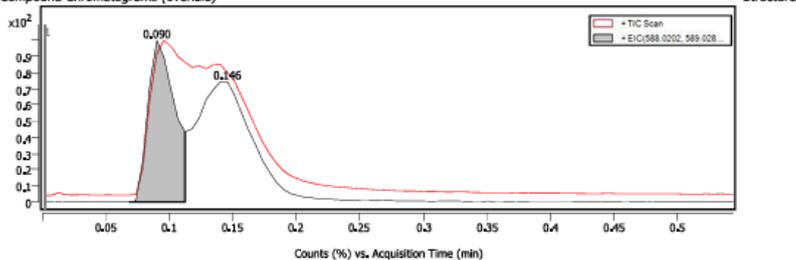
Cpd	Name	Formula	CAS	RT	Mass	Mass (Tgt)	Diff (Tgt, ppm)	Score	Algorithm
1		C27 H28 Br2 N O2 S		0.090	588.0201	588.0208	-1.13	98.85	FBF

Compound Details

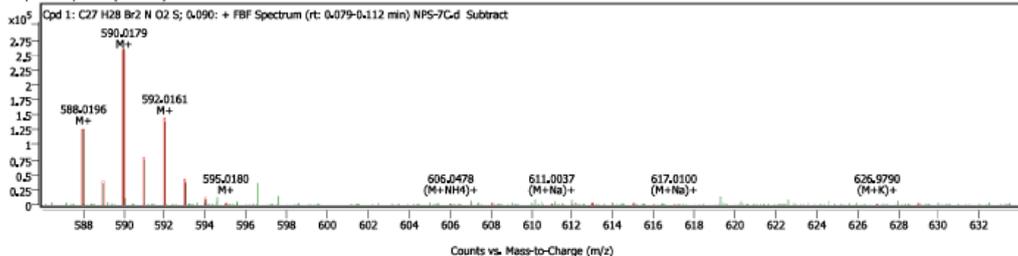
Cpd 1: C27 H28 Br2 N O2 S

Name	Formula	RT	RI	Mass	Diff (Tgt, ppm)	CAS	ID Source	Score	Algorithm
C27 H28 Br2 N O2 S		0.090		588.0201	-1.13		FBF	98.85	FBF
Species		m/z	Score (Tgt)	Score (Lib)	Score (DB)	Score (MFG)	Score (RT)		
M+ (M+NH4)+		588.0196	606.0478	98.85					
(M+Na)+ (M+K)+		611.0037	626.9790						

Compound Chromatograms (overlaid)



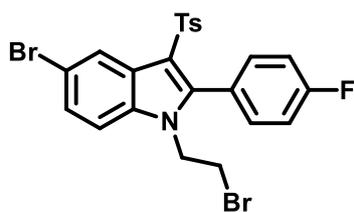
Compound Spectra (overlaid)



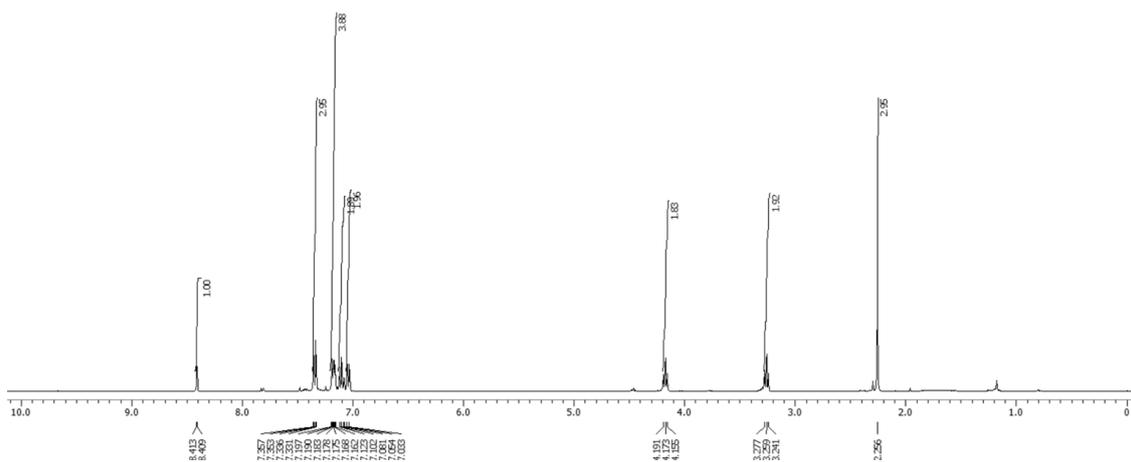
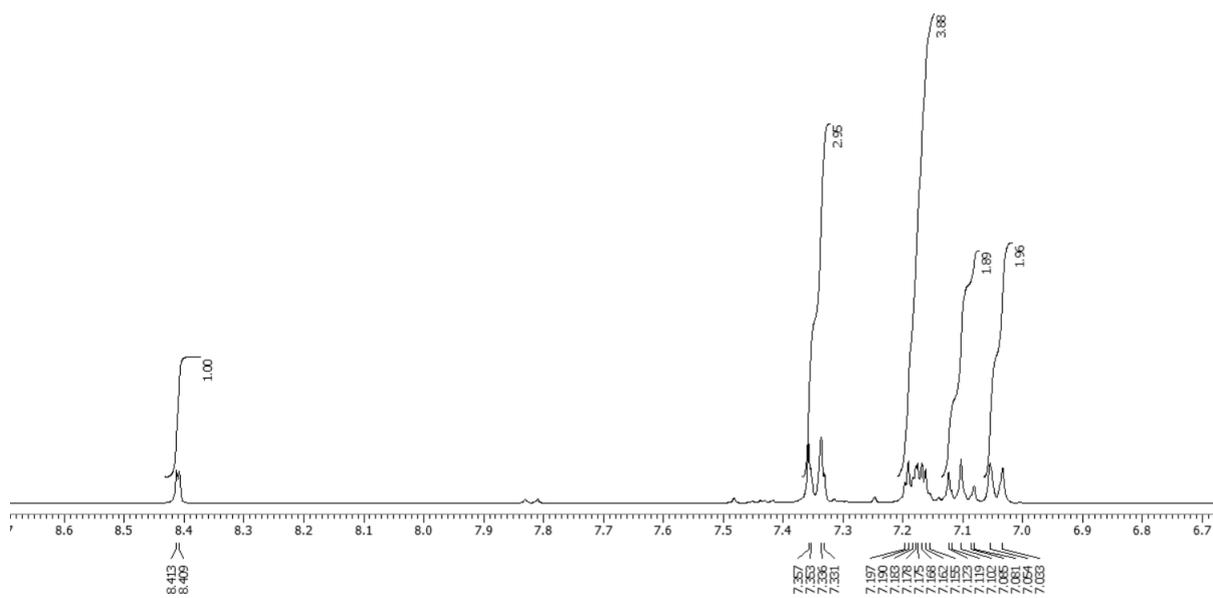
Compound ID Table

Name	Formula	Species	RT	RT Diff	Mass	CAS	ID Source	Score	Score (Lib)	Score (Tgt)
	C27 H28 Br2 N O2 S	M+ (M+NH4)+ (M+Na)+ (M+K)+	0.090		588.0201		FBF	98.85		98.85

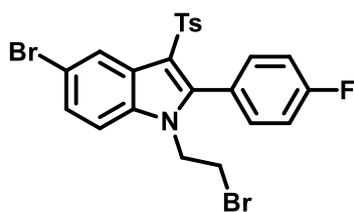
¹H NMR (400 MHz, CDCl₃)



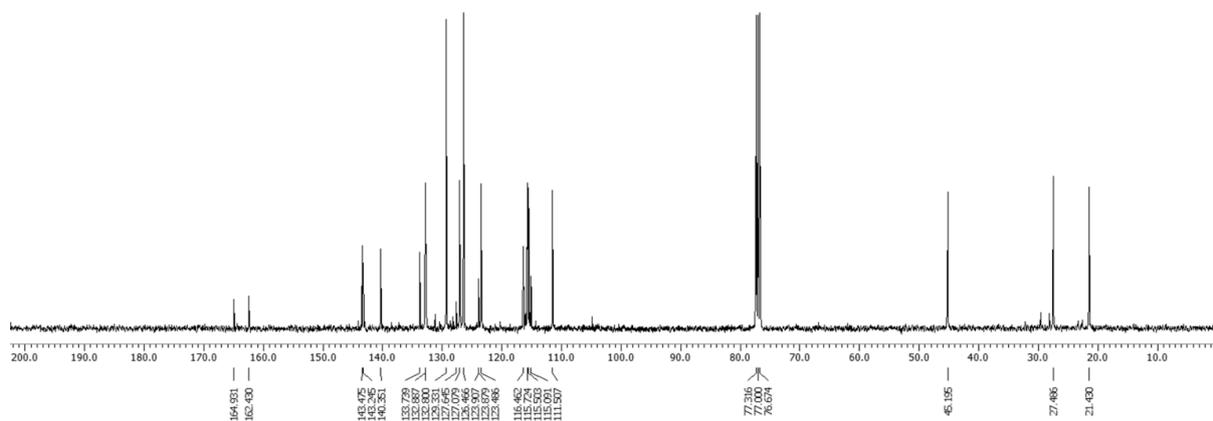
5-bromo-1-(2-bromoethyl)-2-(4-fluorophenyl)-3-tosyl-1H-indole (**4b**).



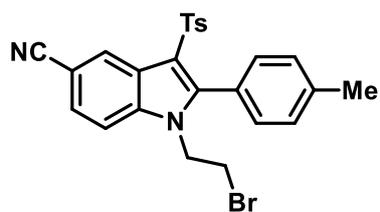
^{13}C { ^1H } NMR (100 MHz, CDCl_3)



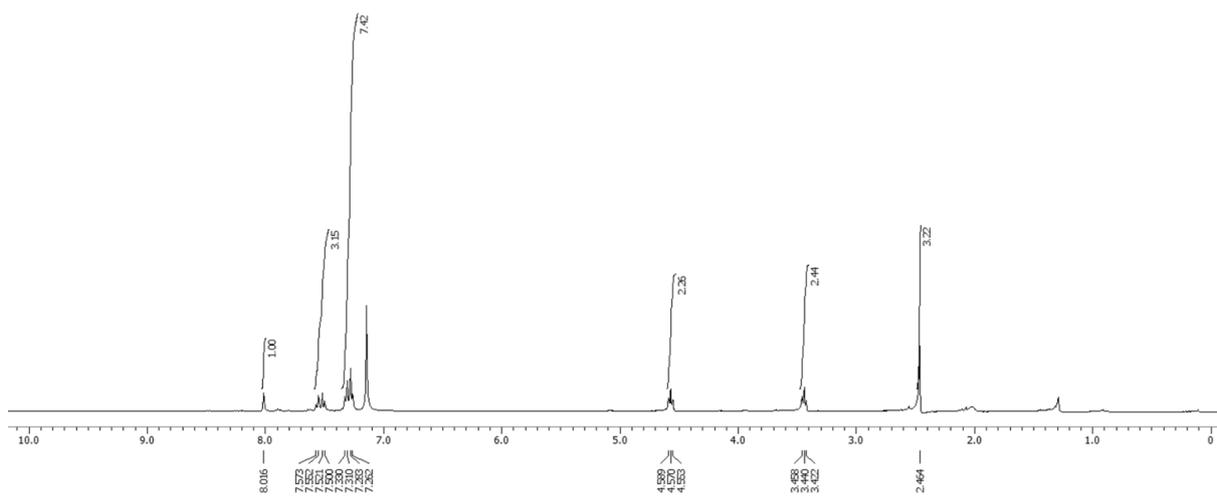
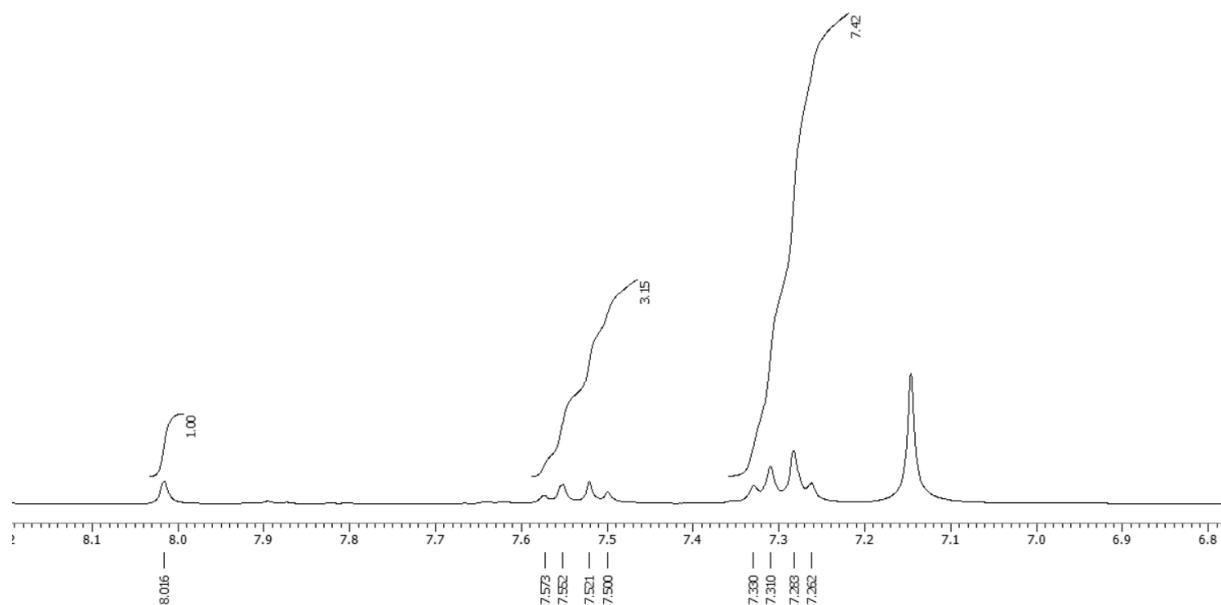
5-bromo-1-(2-bromoethyl)-2-(4-fluorophenyl)-3-tosyl-1H-indole (**4b**).



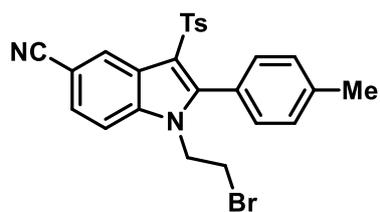
¹H NMR (400 MHz, CDCl₃)



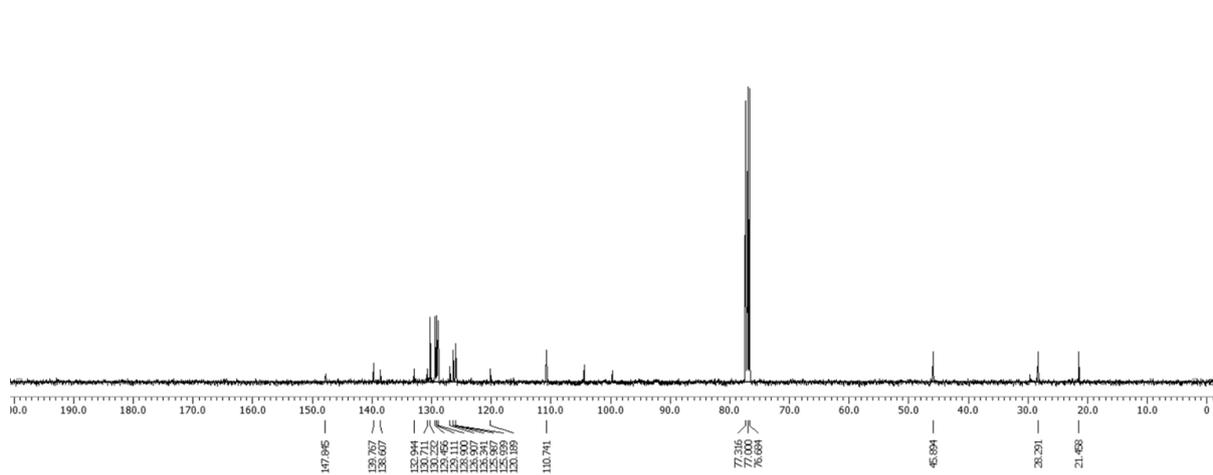
1-(2-bromoethyl)-2-phenyl-3-tosyl-1H-indole-5-carbonitrile (4c).



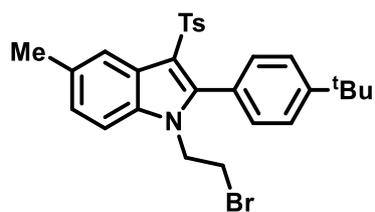
^{13}C { ^1H } NMR (100 MHz, CDCl_3)



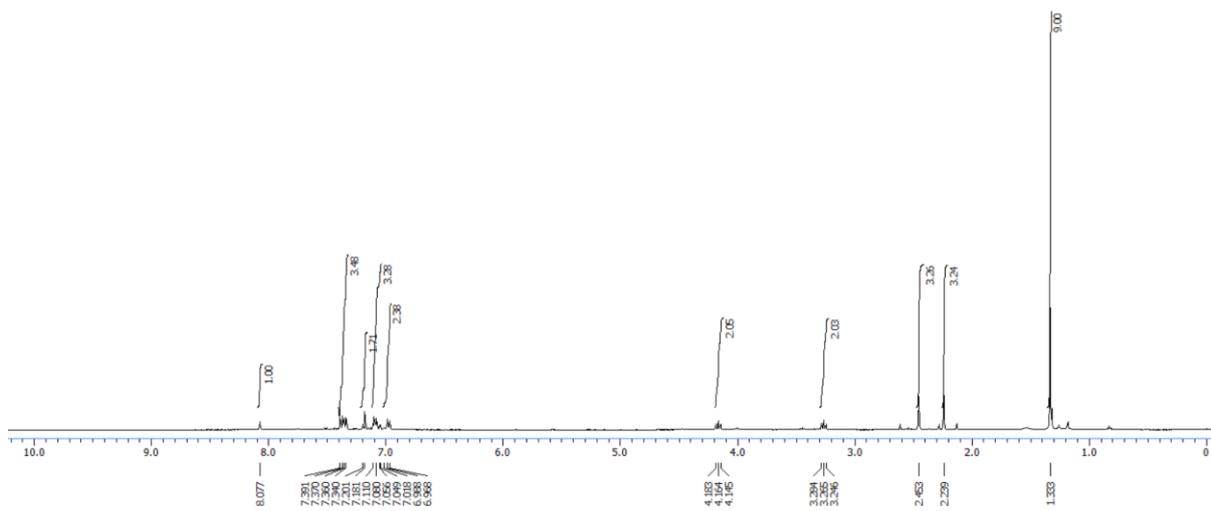
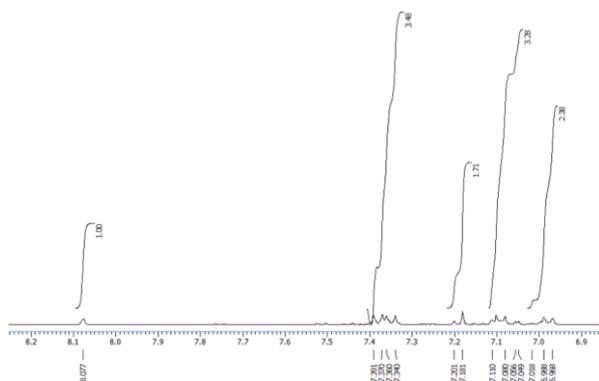
1-(2-bromoethyl)-2-phenyl-3-tosyl-1H-indole-5-carbonitrile (4c).



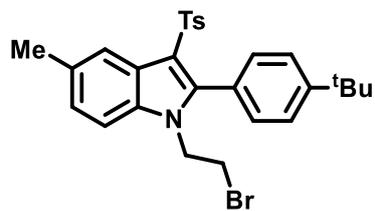
¹H NMR (400 MHz, CDCl₃)



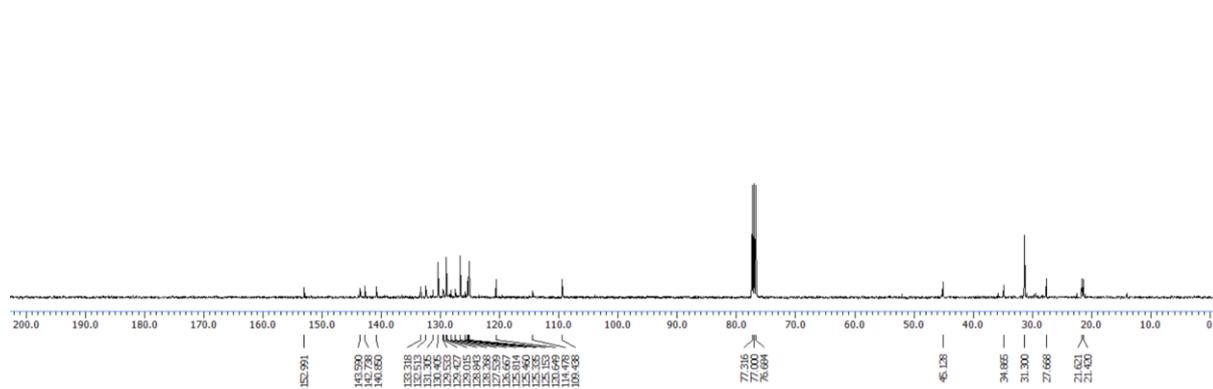
1-(2-bromoethyl)-2-(4-(tert-butyl)phenyl)-5-methyl-3-tosyl-1H-indole (**4d**).



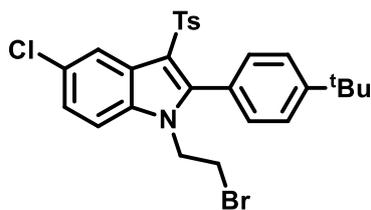
^{13}C { ^1H } NMR (100 MHz, CDCl_3)



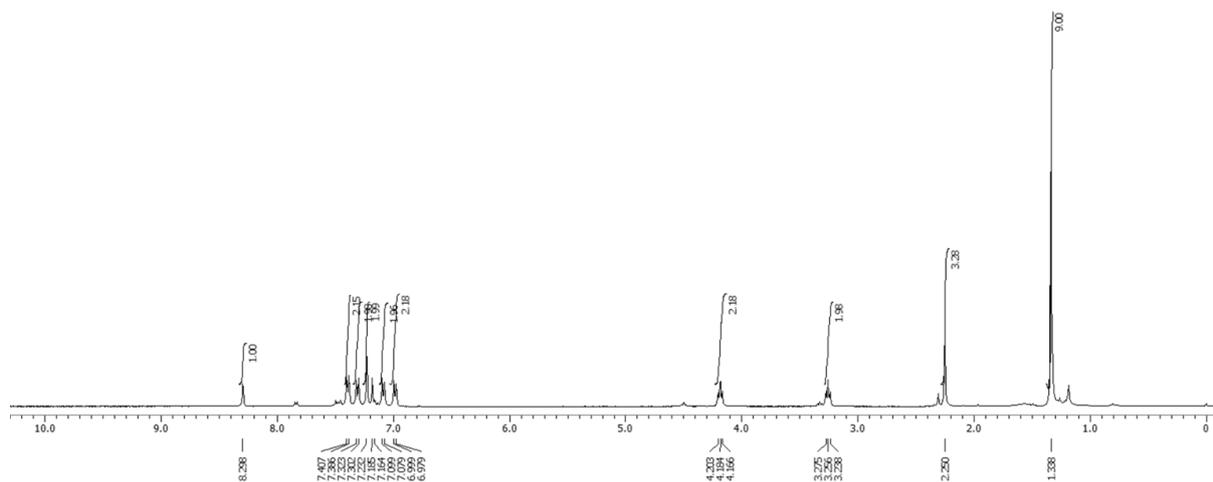
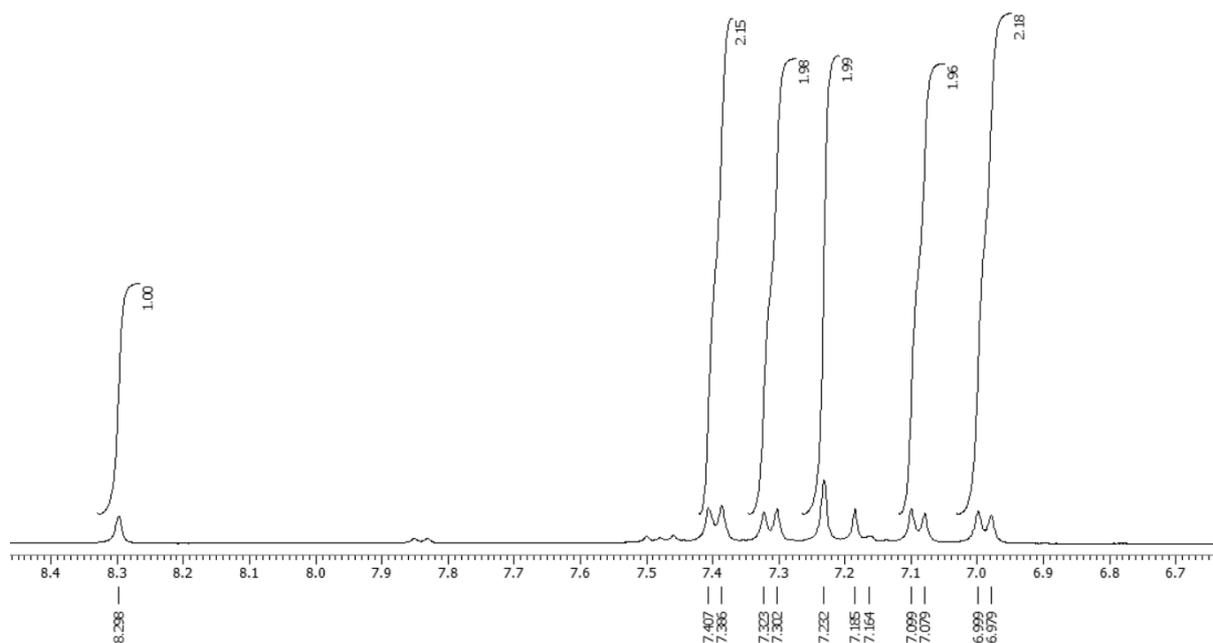
1-(2-bromoethyl)-2-(4-(tert-butyl)phenyl)-5-methyl-3-tosyl-1H-indole (**4d**).



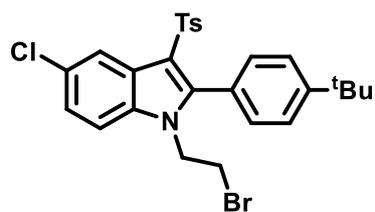
¹H NMR (400 MHz, CDCl₃)



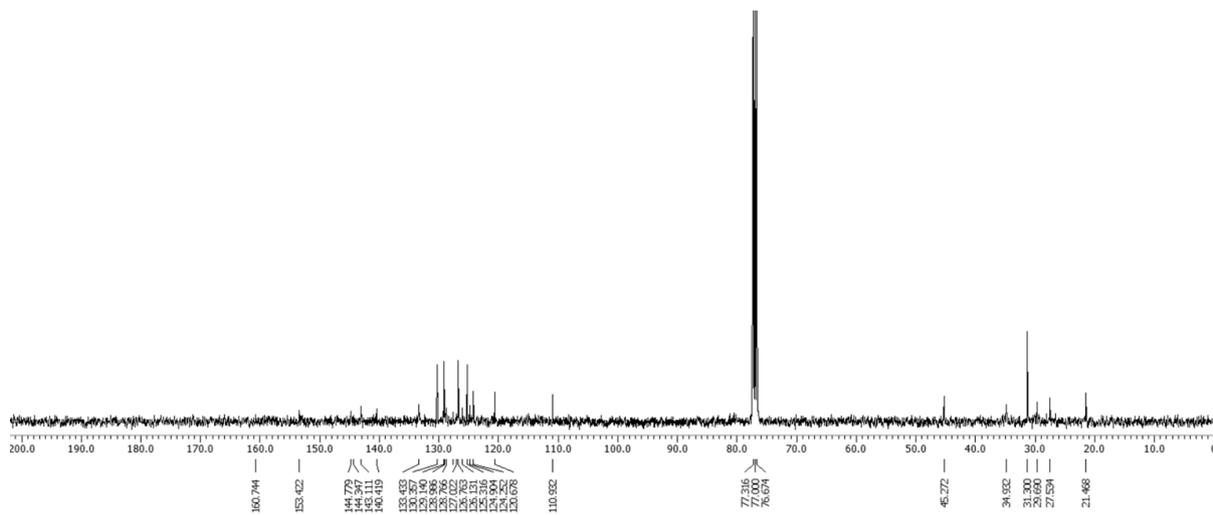
1-(2-bromoethyl)-2-(4-(tert-butyl)phenyl)-5-chloro-3-tosyl-1H-indole (**4e**).



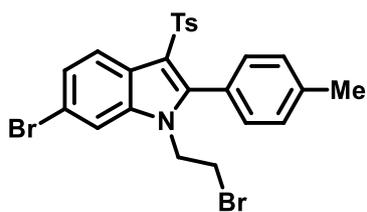
$^{13}\text{C} \{^1\text{H}\}$ NMR (100 MHz, CDCl_3)



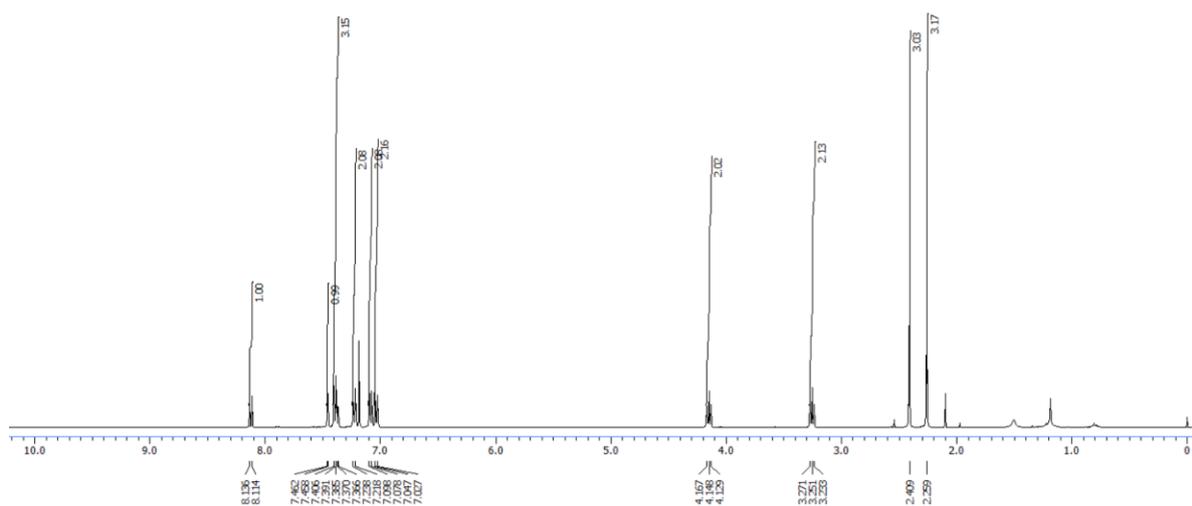
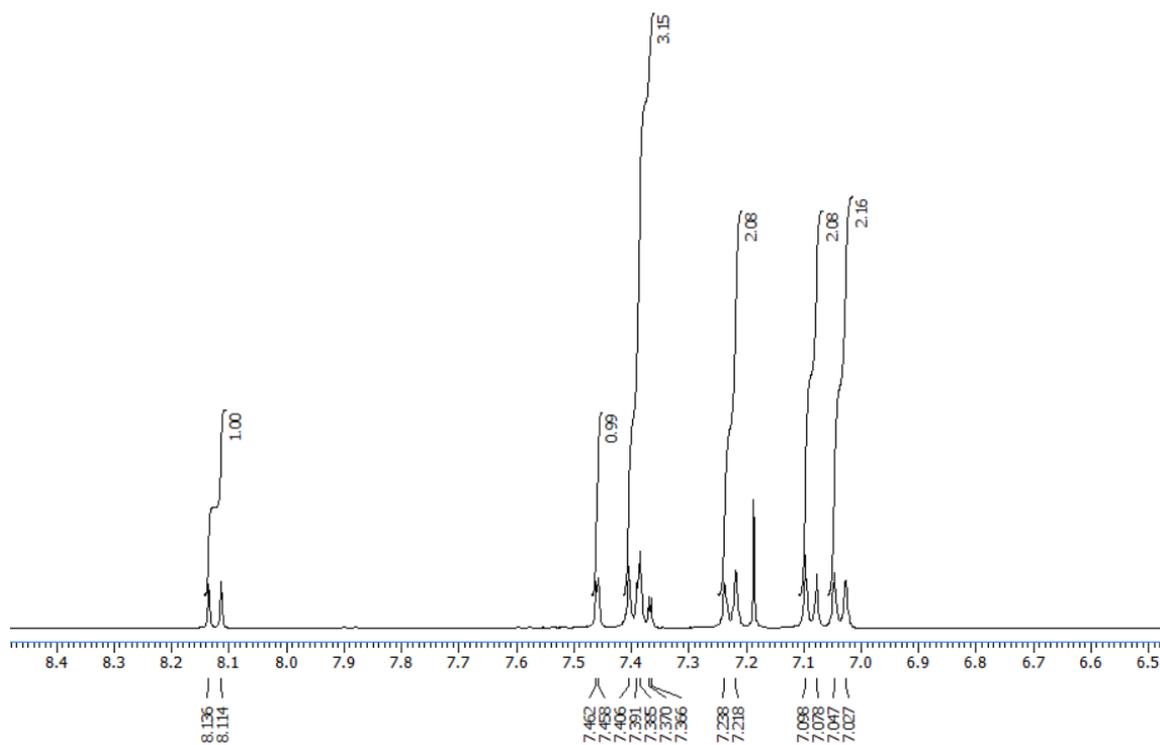
1-(2-bromoethyl)-2-(4-(tert-butyl)phenyl)-5-chloro-3-tosyl-1H-indole(4e)



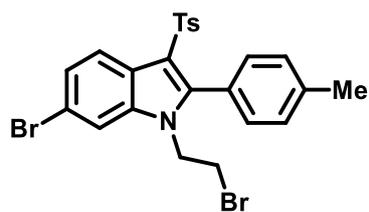
^1H NMR (400 MHz, CDCl_3)



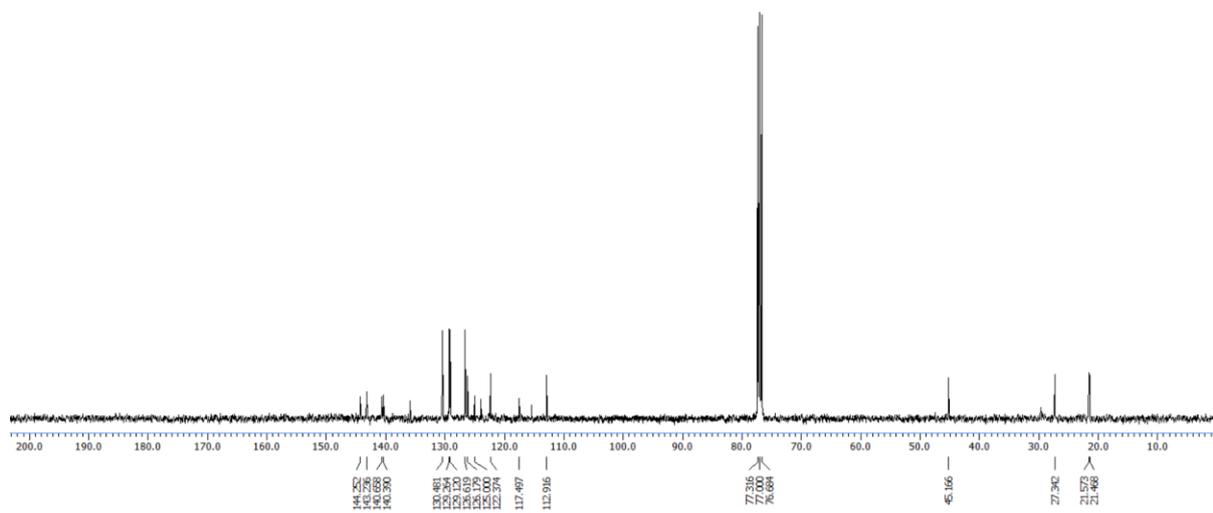
6-bromo-1-(2-bromoethyl)-2-(p-tolyl)-3-tosyl-1H-indole (**4f**).



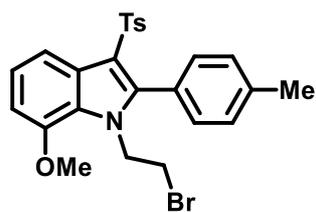
^{13}C { ^1H } NMR (100 MHz, CDCl_3)



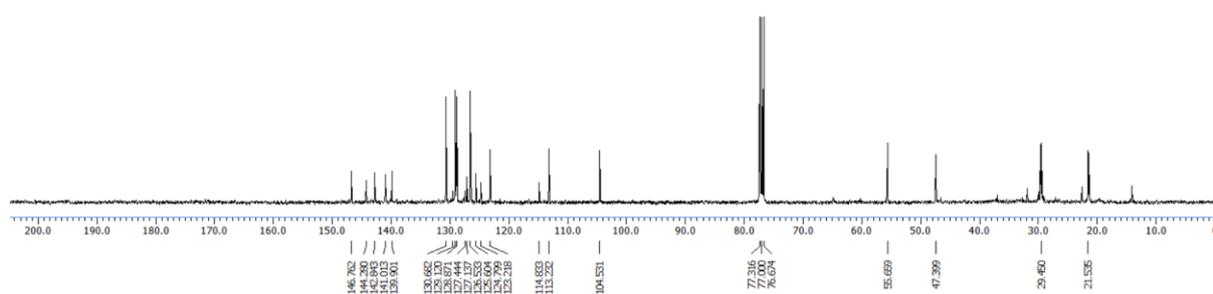
6-bromo-1-(2-bromoethyl)-2-(p-tolyl)-3-tosyl-1H-indole (**4f**).



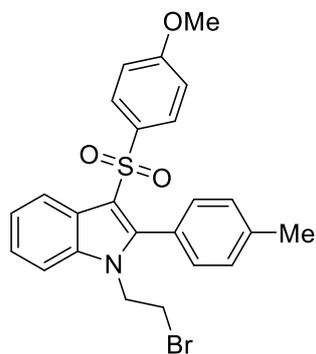
^{13}C { ^1H } NMR (100 MHz, CDCl_3)



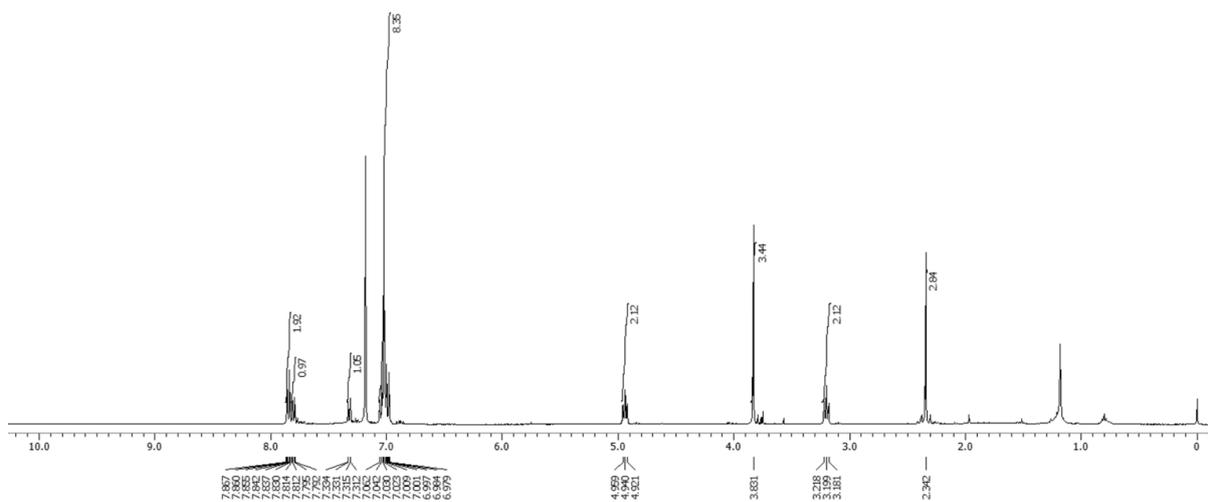
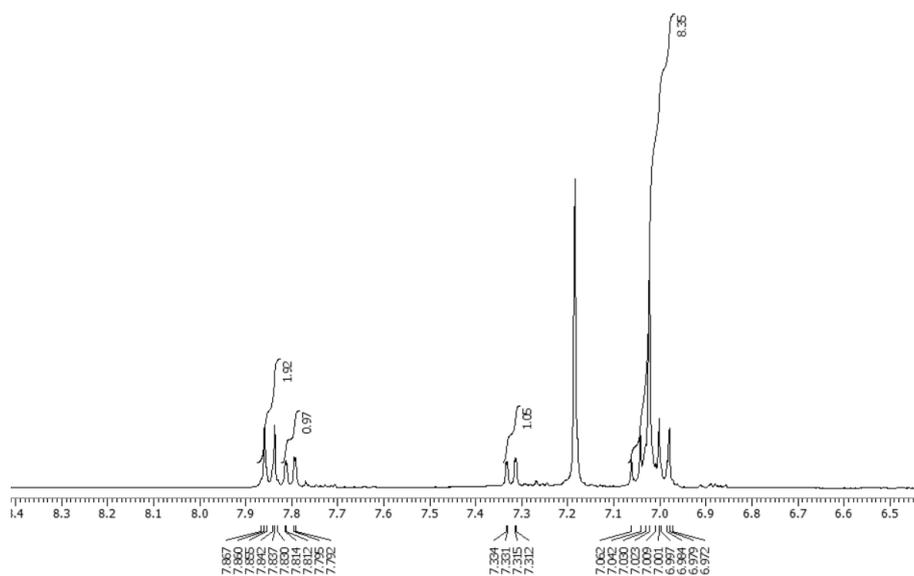
1-(2-bromoethyl)-7-methoxy-2-(p-tolyl)-3-tosyl-1H-indole (**4g**).



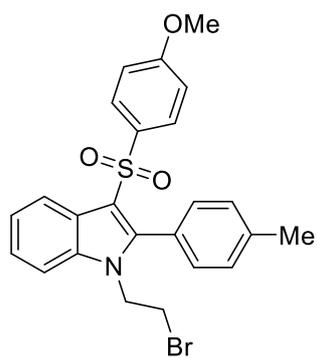
¹H NMR (400 MHz, CDCl₃)



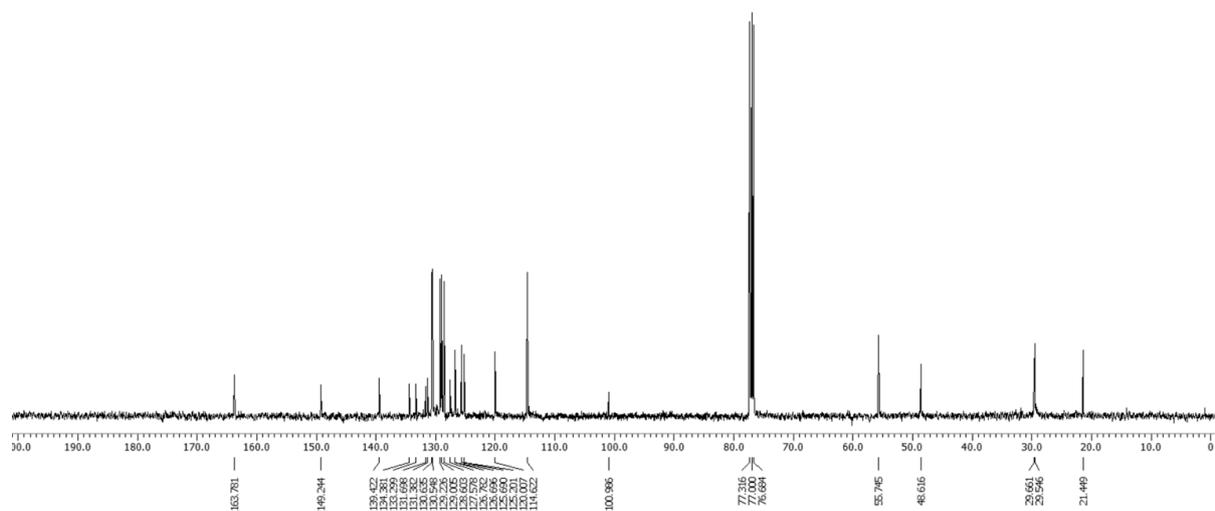
1-(2-bromoethyl)-3-((4-methoxyphenyl)sulfonyl)-2-(p-tolyl)-1H-indole (6a).



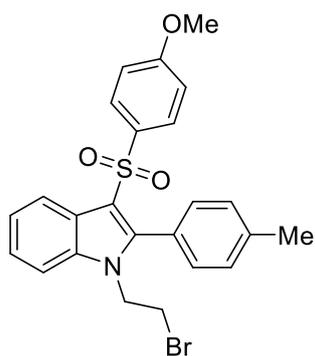
^{13}C { ^1H } NMR (100 MHz, CDCl_3)



1-(2-bromoethyl)-3-((4-methoxyphenyl)sulfonyl)-2-(p-tolyl)-1H-indole (6a).

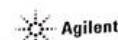


HRMS



1-(2-bromoethyl)-3-((4-methoxyphenyl)sulfonyl)-2-(p-tolyl)-1H-indole (6a).

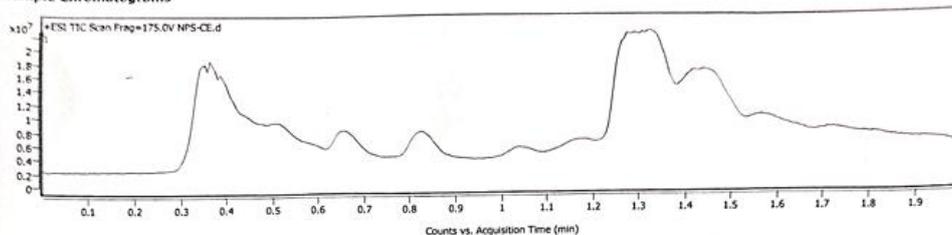
Compound Screening Report



Sample Information

Sample Name	NPS-CE	Data File Path	D:\Projects\PECARAD\data\NPS-CE.d
Sample ID		Acq Time (Local)	04/09/2025 14:31:54 (UTC + 05:30)
Instrument	MS-QTOF	Acq Method Path	D:\Projects\PECARAD\Methods\regular.m
MS Type	QTOF	Acq SW Version	6500 series Q-TOF (12.1.98.0)
Inj Vol (ul)	3	IRH Status	Success
Sample Position	P2-D9	DA Method Path	D:\Projects\Instrument_Verification\Methods\default.m
Plate Position		Target Source Path	
Acq Operator	SYSTEM (SYSTEM)	Result Summary	1 qualified (1 targets)

Sample Chromatograms



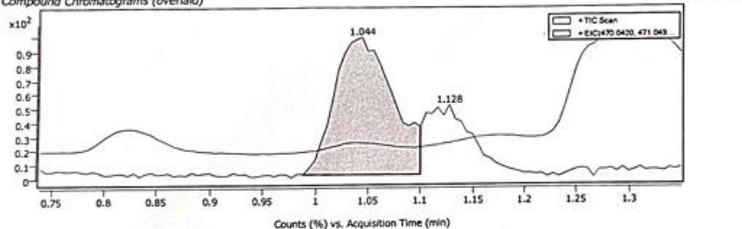
Compound Summary

Cpd	Name	Formula	CAS	RT	Mass	Mass (Tgt)	Diff (Tgt, ppm)	Score	Algorithm
1		C23 H21 Br N O3 S		1.044	470.0426	470.0426	0.10	97.45	FBF

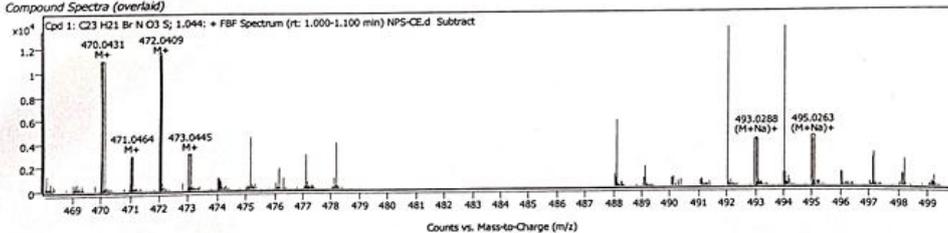
Compound Details

Cpd 1: C23 H21 Br N O3 S									
Name	Formula	RT	RI	Mass	Diff (Tgt, ppm)	CAS	ID Source	Score	Algorithm
	C23 H21 Br N O3 S	1.044		470.0426	0.10		FBF	97.45	FBF
Species	m/z	Score (Tgt)	Score (Lib)	Score (DB)	Score (MFG)	Score (RT)			
M+ (M+Na)+	470.0431 493.0288	97.45							

Compound Chromatograms (overlay)



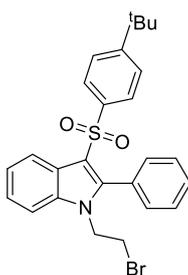
Compound Spectra (overlay)



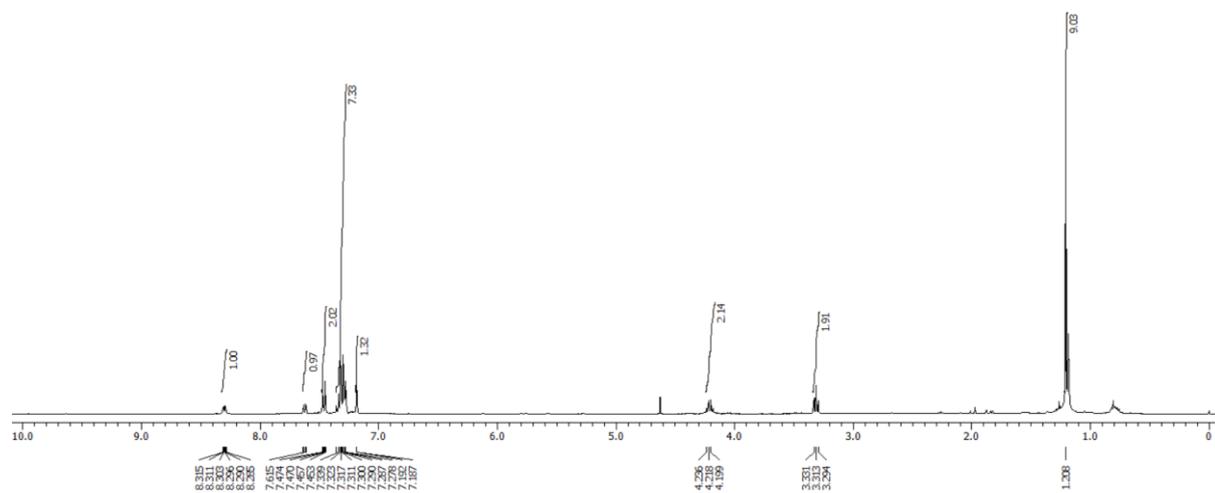
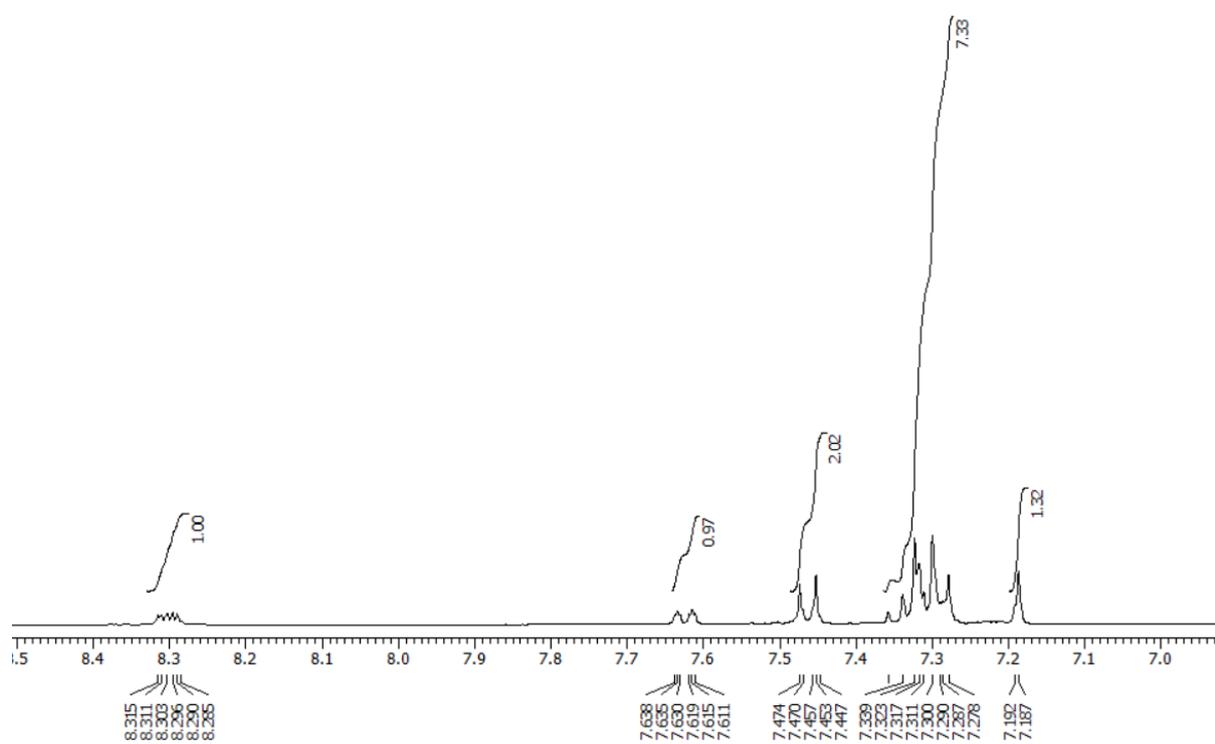
Compound ID Table

Name	Formula	Species	RT	RT Diff	Mass	CAS	ID Source	Score	Score (Lib)	Score (Tgt)
	C23 H21 Br N O3 S	M+ (M+Na)+	1.044		470.0426		FBF	97.45		97.45

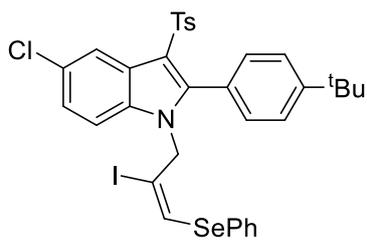
¹H NMR (400 MHz, CDCl₃)



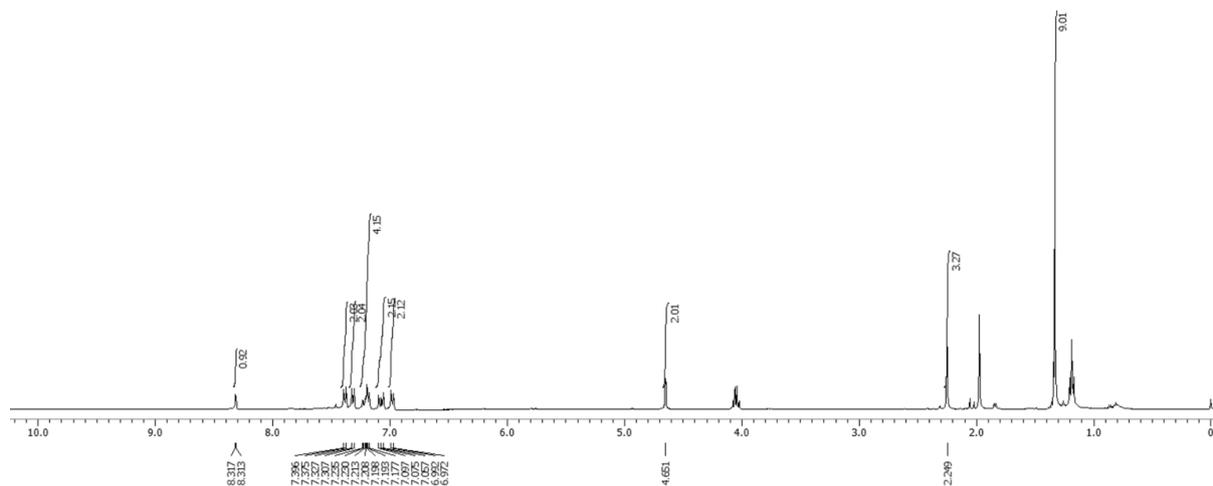
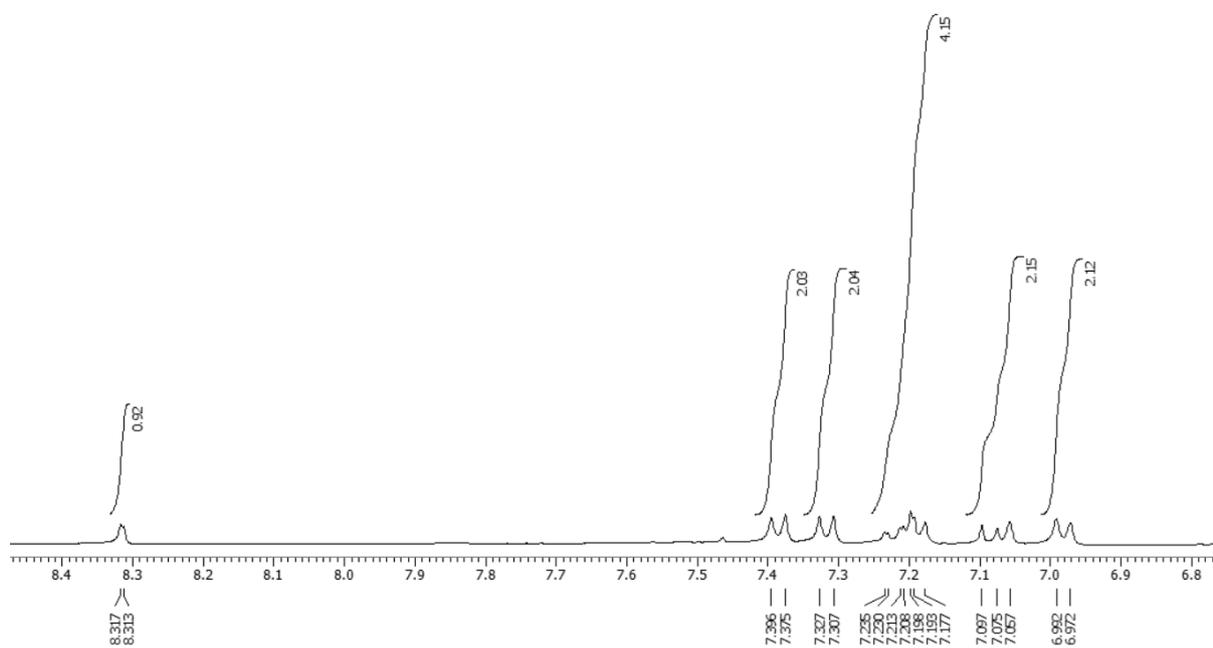
1-(2-bromoethyl)-3-((4-(tert-butyl)phenyl)sulfonyl)-2-phenyl-1H-indole (6b).



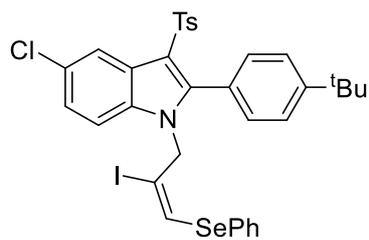
¹H NMR (400 MHz, CDCl₃)



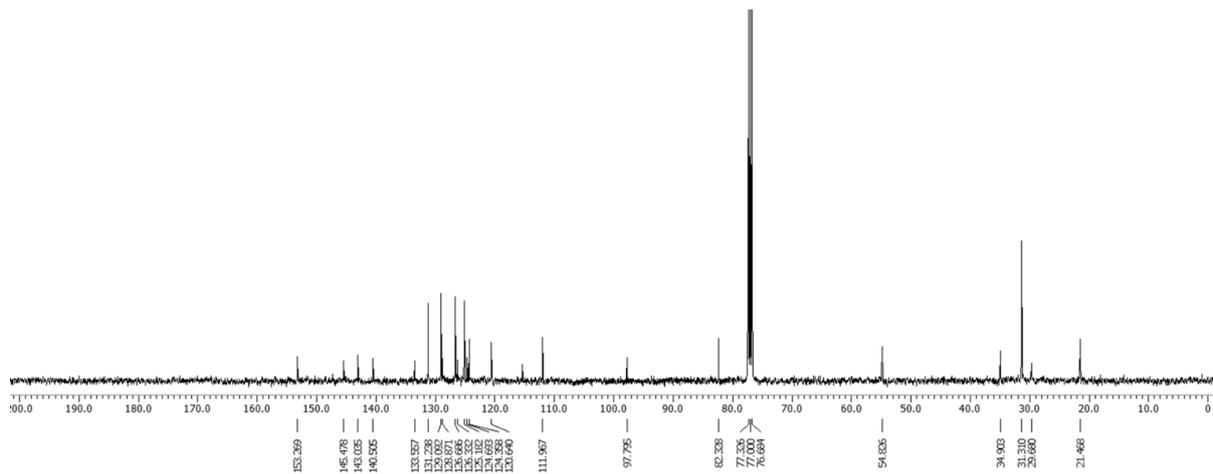
(E)-2-(4-(tert-butyl)phenyl)-5-chloro-1-(2-iodo-3-(phenylselanyl)allyl)-3-tosyl-1H-indole (**8a**)



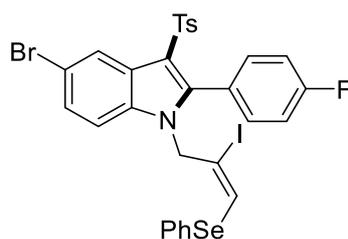
^{13}C { ^1H } NMR (100 MHz, CDCl_3)



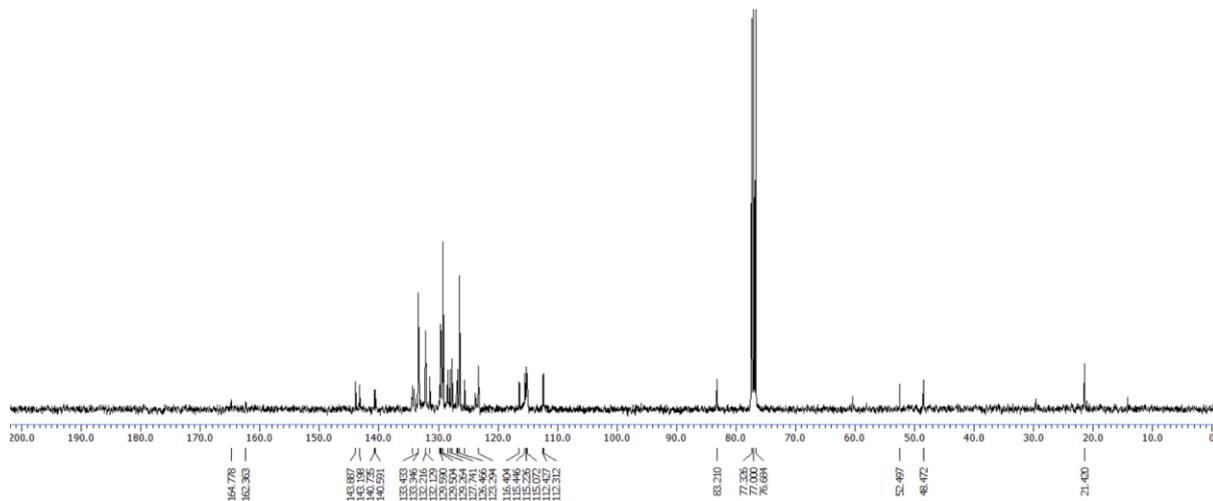
(E)-2-(4-(tert-butyl)phenyl)-5-chloro-1-(2-iodo-3-(phenylselanyl)allyl)-3-tosyl-1H-indole (**8a**)



^{13}C { ^1H } NMR (100 MHz, CDCl_3)

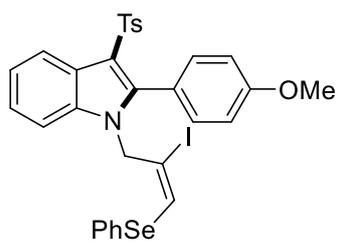


(E)-5-bromo-2-(4-fluorophenyl)-1-(2-iodo-3-(phenylselanyl)allyl)-3-tosyl-1H-indole (**8b**)

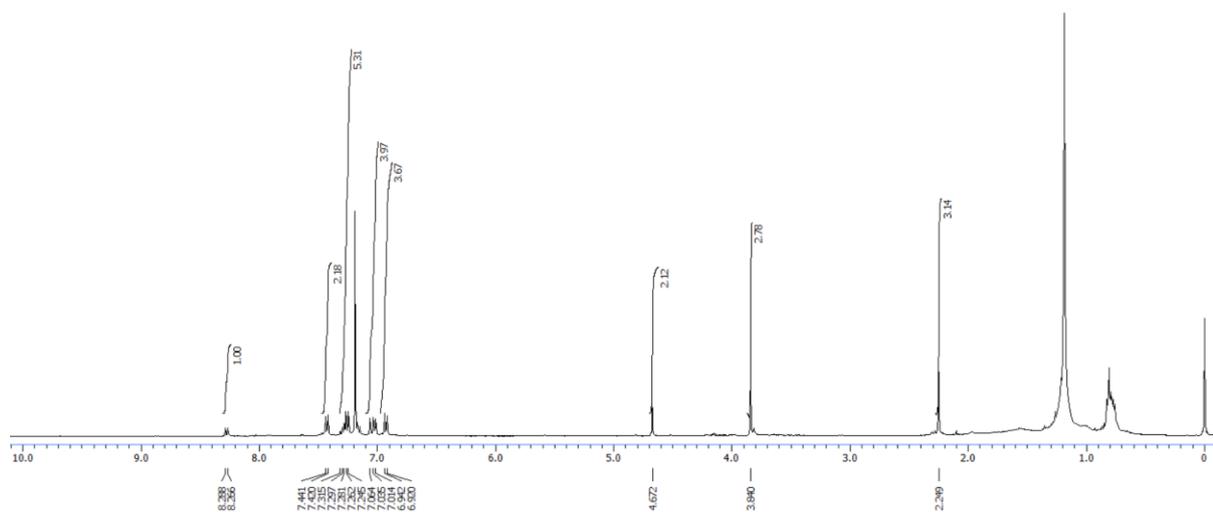


^{13}C -NMR (101 MHz, CHLOROFORM-D) δ 164.8, 162.4, 143.9, 143.2, 140.7, 140.6, 134.4, 133.4, 133.3, 132.2, 132.1, 131.5, 129.8, 129.6, 129.5, 129.3, 128.5, 128.1, 127.7, 126.9, 126.8, 126.5, 125.6, 123.3, 116.4, 115.4, 115.2, 115.1, 112.4, 112.3, 83.2, 77.3, 77.0, 76.7, 52.5, 48.5, 21.4

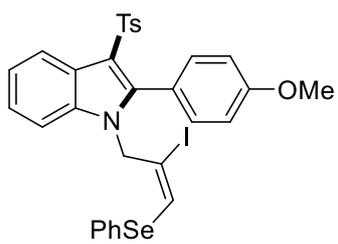
^1H NMR (400 MHz, CDCl_3)



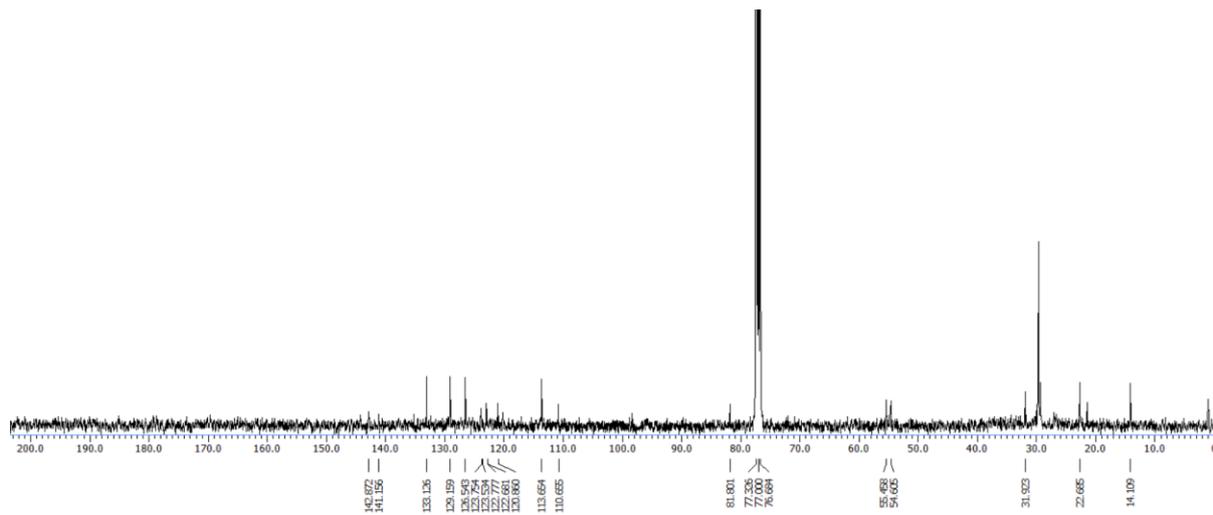
(E)-1-(2-iodo-3-(phenylselanyl)allyl)-2-(4-methoxyphenyl)-3-tosyl-1H-indole (**8c**)



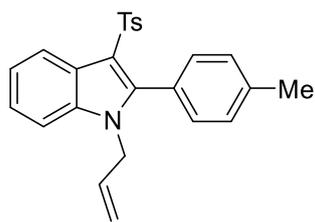
^{13}C { ^1H } NMR (100 MHz, CDCl_3)



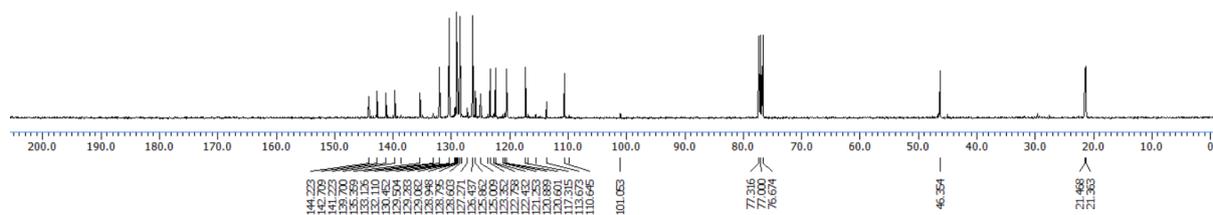
(E)-1-(2-iodo-3-(phenylselanyl)allyl)-2-(4-methoxyphenyl)-3-tosyl-1H-indole (**8c**)



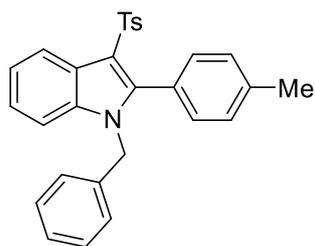
^{13}C { ^1H } NMR (100 MHz, CDCl_3)



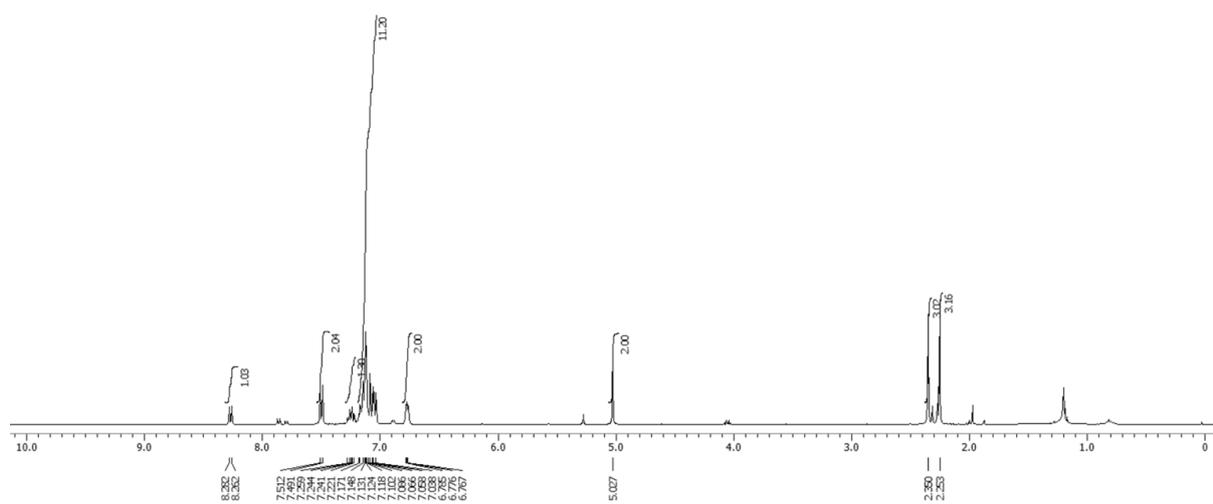
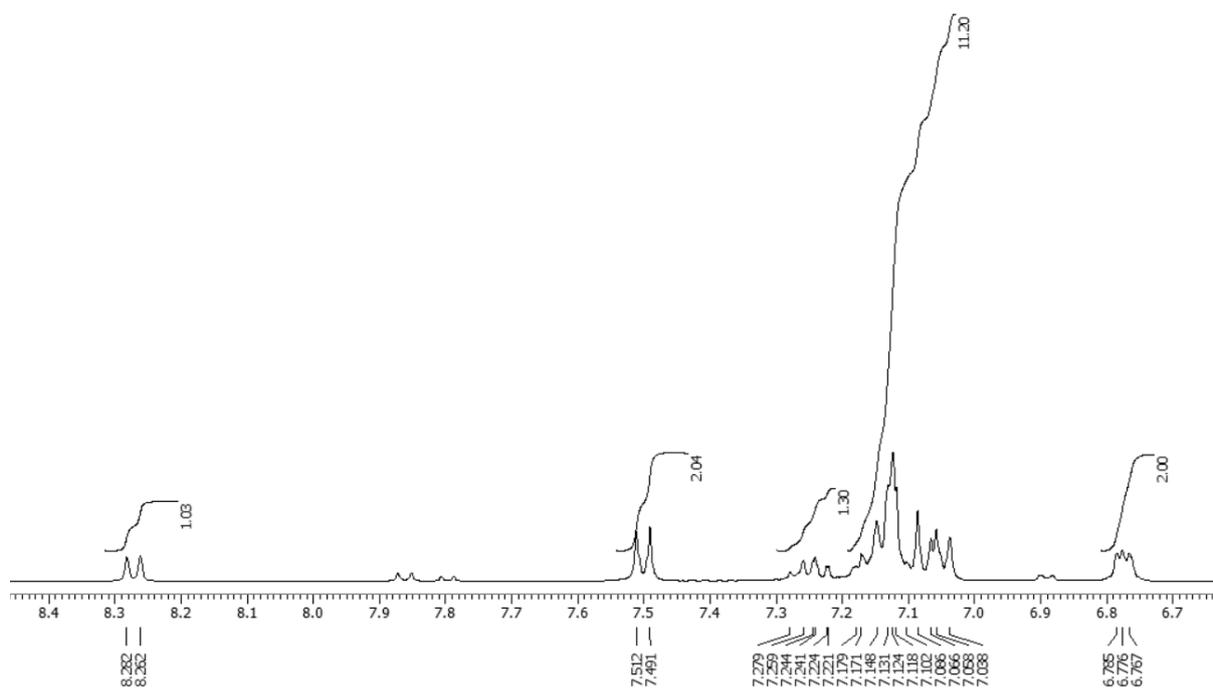
1-allyl-2-(p-tolyl)-3-tosyl-1H-indole (**8d**)



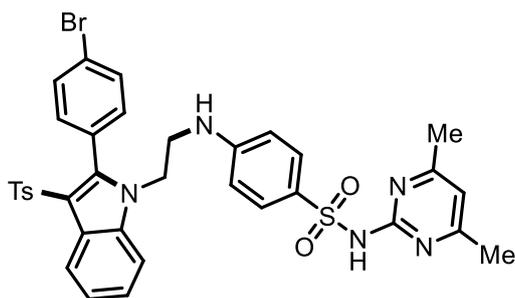
¹H NMR (400 MHz, CDCl₃)



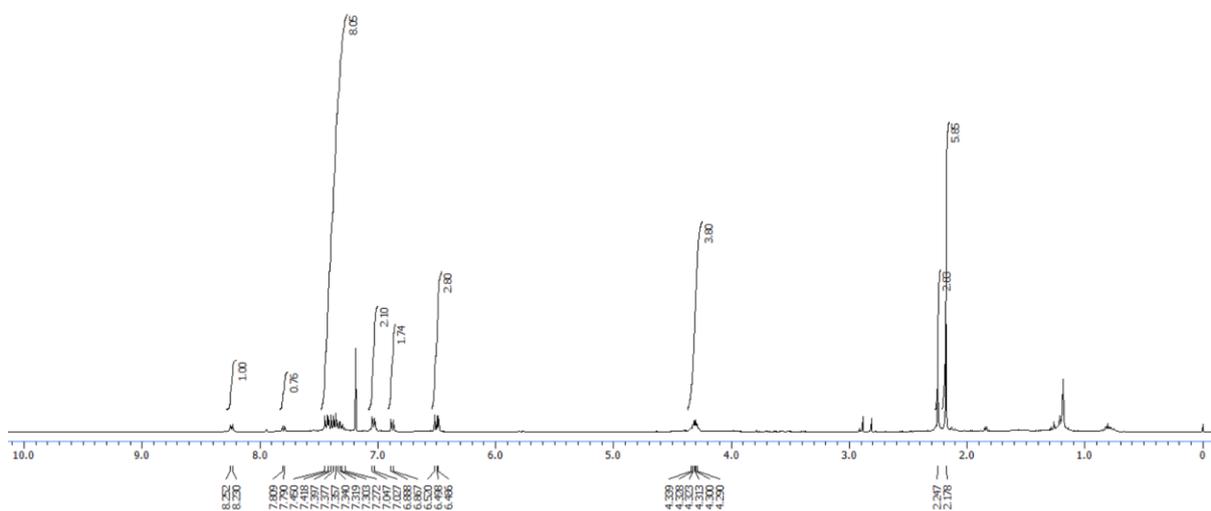
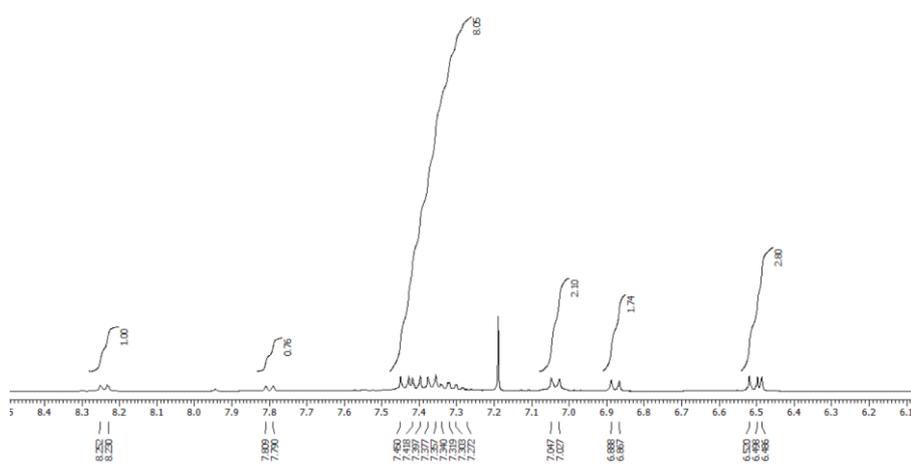
1-benzyl-2-(p-tolyl)-3-tosyl-1H-indole(**8e**)



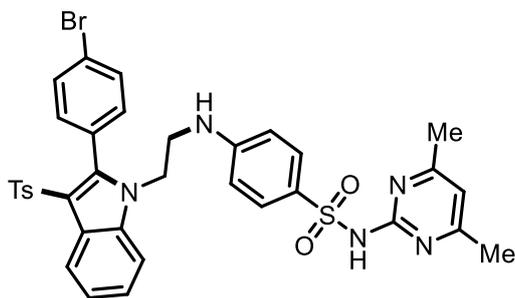
¹H NMR (400 MHz, CDCl₃)



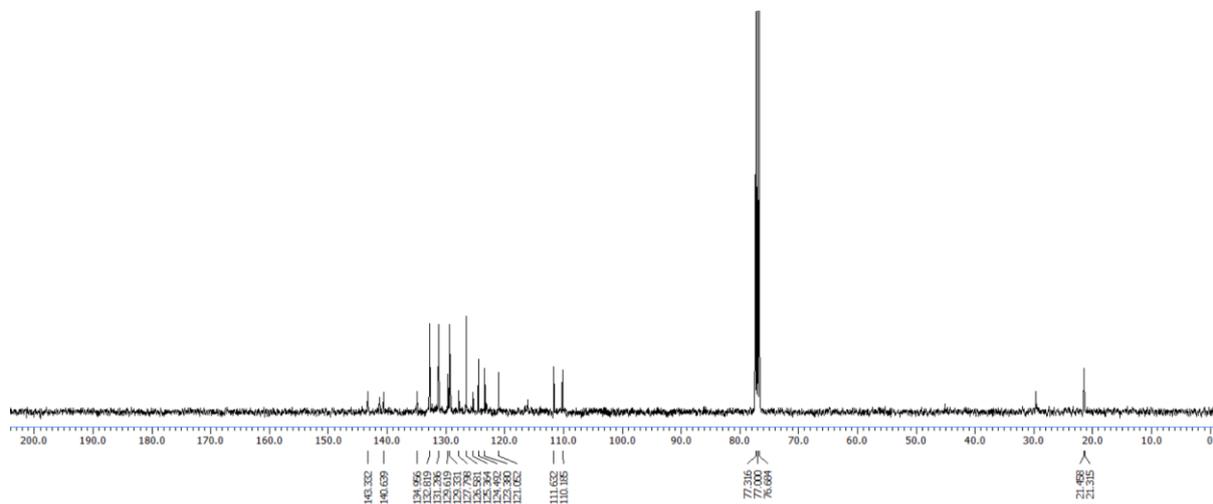
4-((2-(2-(4-bromophenyl)-3-tosyl-1H-indol-1-yl)ethyl)amino)-N-(4,6-dimethylpyrimidin-2-yl)benzenesulfonamide (**9b**)



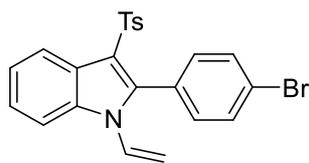
^{13}C { ^1H } NMR (100 MHz, CDCl_3)



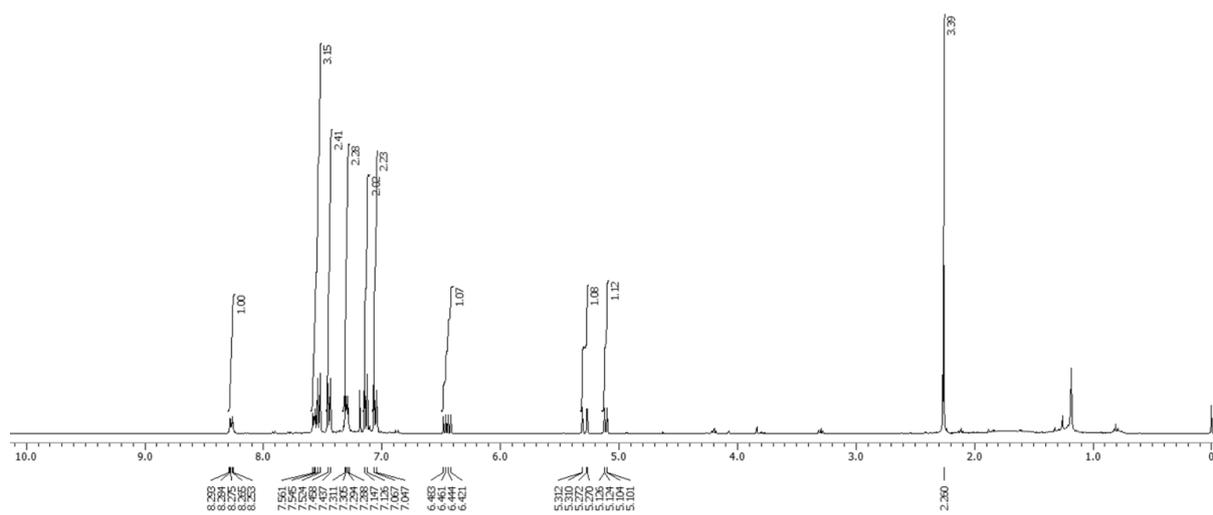
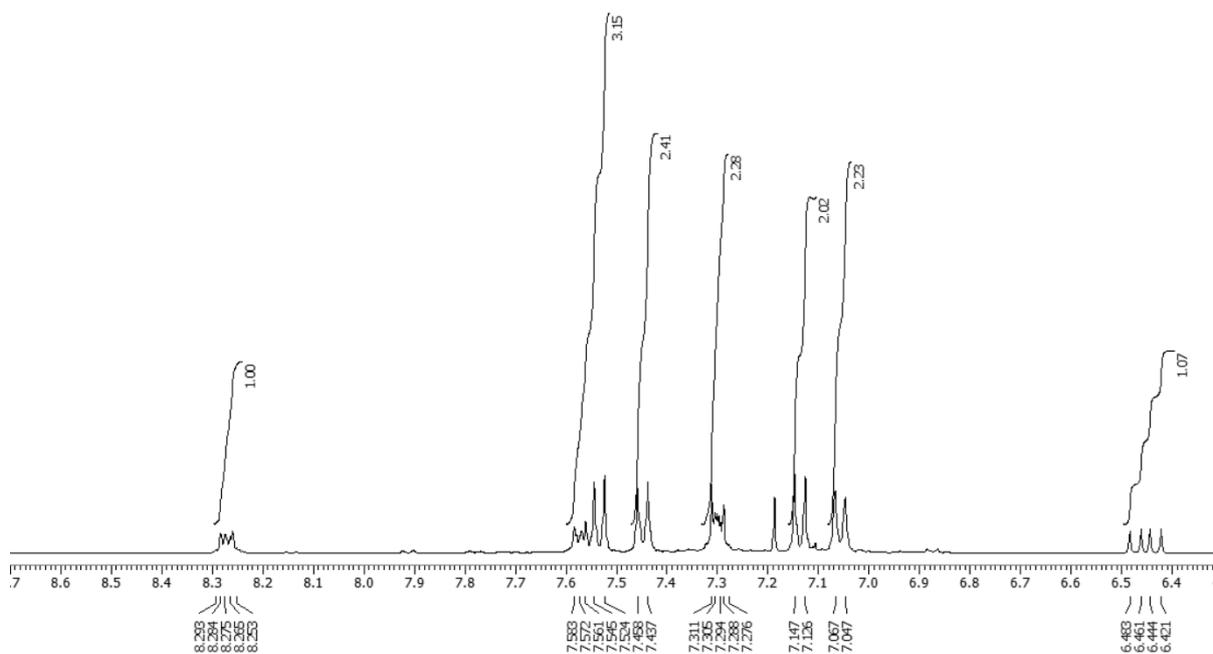
4-((2-(2-(4-bromophenyl)-3-tosyl-1H-indol-1-yl)ethyl)amino)-N-(4,6-dimethylpyrimidin-2-yl)benzenesulfonamide (**9b**)



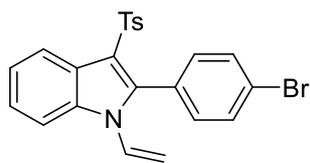
¹H NMR (400 MHz, CDCl₃)



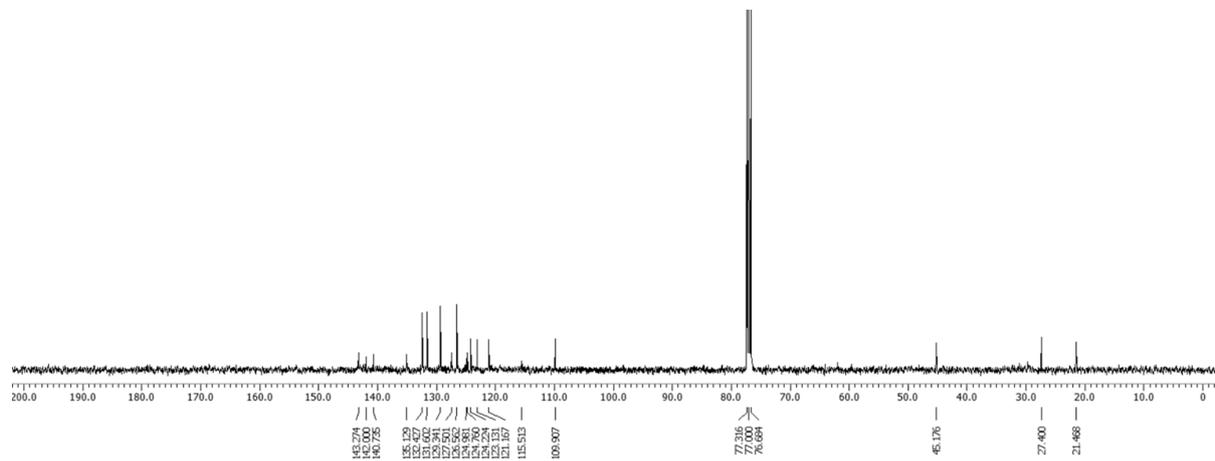
2-(4-bromophenyl)-3-tosyl-1-vinyl-1H-indole (**10b**)



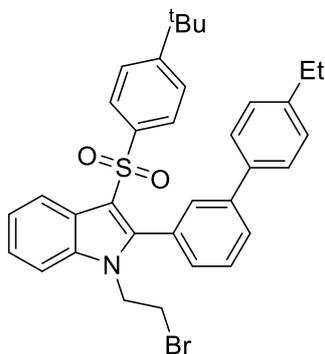
^{13}C { ^1H } NMR (100 MHz, CDCl_3)



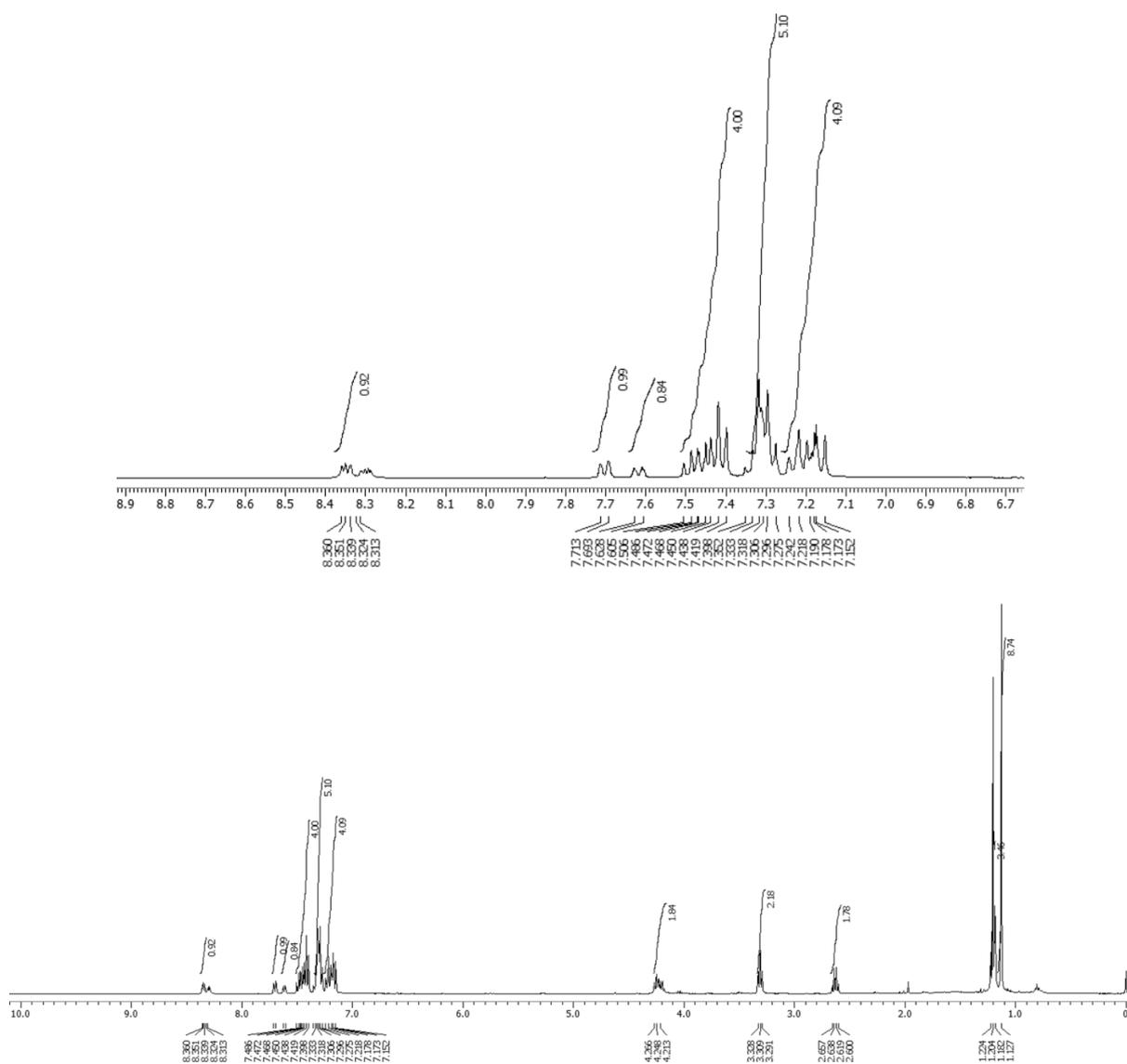
2-(4-bromophenyl)-3-tosyl-1-vinyl-1H-indole (**10b**)



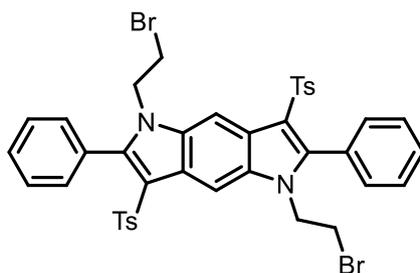
¹H NMR (400 MHz, CDCl₃)



1-(2-bromoethyl)-3-((4-(tert-butyl)phenyl)sulfonyl)-2-(4'-ethyl-[1,1'-biphenyl]-3-yl)-1H-indole (**11b**)



¹H NMR (400 MHz, CDCl₃)



1,5-bis(2-bromoethyl)-2,6-diphenyl-3,7-ditosyl-1,5-dihydropyrrolo[2,3-f] indole (**12b**)

