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Electronic Supporting Information

Graphene Oxide Grafted with $Pd_{17}Se_{15}$ Nano-particles Generated from Single Source Precursor as Recyclable and Efficient Catalyst for C–O Coupling in *O*-Arylation at Room Temperature

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1. Experimental Section

General

^{1}H, ^{13}C{^{1}H} and ^{77}Se{^{1}H} NMR spectra were recorded on a Bruker Spectrospin DPX 300 NMR spectrometer at 300.13, 75.47 and 57.24 MHz respectively. The chemical shifts are reported in ppm relative to the residual deuterated solvent or the internal standard (tetramethylsilane in case of ^{1}H, ^{13}C{^{1}H} NMR and Me_2Se for ^{77}Se{^{1}H} NMR). All reactions were carried out in glassware dried in an oven at room temperature. X-ray diffraction data for crystals of **1** was collected on a BRUKER AXS SMART−APEX CCD diffractometer using Mo-Kα = 0.71073 Å radiations. Frames were collected at T = 298 K by ω, φ, and 2θ-rotations with full quadrant data collection strategy (four domains each with 600 frames) at 10s per frame with SMART. The measured intensities were reduced to F^2 and corrected for absorption with SADABS.[1] Structure solution, refinement, and data output were carried out with the SHELXTL package by direct methods.[2] Non-hydrogen atoms were refined anisotropically.

Scanning electron microscope (SEM) studies Carl ZEISS EVO5O instrument was used. Sample was mounted on a circular metallic sample holder with a sticky carbon tape. The associated EDX system Model QuanTax 200, which is based on the SDD technology and provides an energy resolution of 127 eV at Mn K alpha was used for estimating elemental compositions. Powder X-ray diffraction (PXRD) studies were carried out on a Bruker D8 Advance diffractometer using Ni-filtered Cu$K\alpha$ radiation, scan speed of 1 s and scan step of 0.05°. Transmission electron microscopic (TEM) studies were carried out using a JEOL JEM 200CX TEM instrument operated at 200 kV. The specimens for these studies were prepared by dispersing the powdered sample in ethanol by ultrasonic treatment. Few drops of resulting solution were put on a porous carbon film supported on a copper grid and dried in air. Estimation of palladium in nanoparticles was carried out with an AA700 Series atomic absorption spectrometer (Lab India).

Chemicals

Trioctylphosphine (TOP), $PdCl_2$, graphite flakes, diphenyldiselenide 1,3-dibromo-2-propanol, sodium borohydride procured from Sigma-Aldrich (USA) were used as received. All the solvents of AR grade i.e. toluene, acetone, chloroform, acetonitrile and ethanol were dried and distilled before use by known standard procedures.[3]

The synthesis of ligand and complexes are detailed below and summarized in Scheme S1

Synthesis of Ligand L:

Diphenyldiselenide (0.624 g, 2 mmol) dissolved in 30 mL of EtOH was stirred under N_2 atmosphere at room temperature. Sodium borohydride (2 equivalent) was added to it as solid and the mixture was further stirred for 15 min. When it became colourless due to the formation of PhSeNa, 1,3-dibromo-2-propanol (0.436 g, 2 mmol) dissolved in 10 cm^3 of ethanol was added with constant stirring and the mixture stirred further for 3 h. It was extracted with chloroform (4 × 25 mL). The extract was washed with water (3 × 40 mL) and dried over anhydrous sodium sulphate. The solvent was evaporated off under reduced pressure on a rotary evaporator to get ligand **L** as yellow oil. Yield (0.59 g, 80%) ^{1}H NMR ($CDCl_3$, 25 ºC, TMS); (δ, ppm): 2.76 (s,1H, OH) 3.00 – 3.19 (m, 4H, CH_2Se), 3.81–3.87 (m, 1H, CHOH), 7.23–7.25 (m, 6H, m-Ar, p-Ar), 7.46–7.50 (m, 4H, o-Ar); ^{3}C{^{1}H} NMR ($CDCl_3$, 25 ºC, TMS); (δ, ppm): 34.93 (C_5), 69.12 (C_6), 127.31 (C_1), 129.20 (C_2), 129.26 (C_4), 132.97 (C_3).

Synthesis of Complex 1:

[$PdCl_2(CH_3CN)_2$] (0.516 g, 0.2 mmol) was added to a stirred solution of **L** (0.074 g, 0.2 mmol) made in CH_3CN (5 mL) at 70° C. The reaction mixture was stirred for 7 h, concentrated with a rotary evaporator and mixed with diethyl ether. The resulting orange coloured compound, was filtered, washed with diethyl ether (10 ml) and dried *in vacuo* to give **[Pd(L)Cl$_2$]** (**1**) as a yellow solid. Crystals of **1** were grown by slow evaporation of its solution in acetonitrile and methanol mixture (3:1). Yield (0.092 g, 85%), m.p.- 215℃. ^{1}H NMR (DMSO-d_6, 25 ºC, TMS); (δ, ppm): 2.10 (s, 1H, OH), 2.93 – 3.20 (m, 4H, CH_2Se), 3.63 (s, 1H, CHOH), 7.28 – 7.45 (m, 6H, m-Ar, p-Ar), 8.02 (S, 4H, o-Ar); ^{13}C{^{1}H} NMR (DMSO-d_6, 25 ºC, TMS); (δ, ppm): 33.74 (C_6), 66.83 (C_5), 128.86 (C_1), 129.76 (C_3), 130.09 (C_4), 133.32 (C_3).

Crystal structure of 1:

The crystals were found long, rod shaped, and orange in colour. The single crystal structure of complex **1** has been solved. Its crystal and refinement data are given in Table T1. In Table T2 bond lengths and angles are given. The geometry of palladium is nearly square planar. The **L** is coordinated with Pd in a bidentate mode forming a six membered chelate ring. The Pd−Se bond lengths of complex **1** are 2.386(14) and 2.389(16) Å, consistent with earlier reported values[4] 2.381(7)–2.385(5) Å for species [$PdCl_2$(Se, N)ligand] and [PdCl(N, Se, Ngand]$^+$, in which also the six membered chelate ring is present.

Synthesis of Graphene Oxide (GO):

GO was synthesized by the modified Hummers' method[5]. In a typical procedure, 500 mg of graphite powder and 2.0 g of sodium nitrate ($NaNO_3$) were put in cold (below 5 °C) concentrated H_2SO_4 (18 mL, 98%). The mixture was stirred continuously for 1 h and the temperature was kept below 5 °C by cooling in an ice bath. Thereafter, 3 g of potassium permanganate ($KMnO_4$) was added gradually and reaction was continued for another 2 h at a temperature below 5 °C. The mixture was heated to 35 °C for 30 min and 40 mL of deionised (DI) water was added to it slowly while increasing temperature. It was kept at 100 °C for 15 min, diluted with 70 mL of DI water and cooled to room temperature. The colour of the suspension changed to bright yellow after adding 10 mL of H_2O_2 (35%). The suspension was filtered and washed with 400 mL of 5% HCl twice followed by further washing with 200 mL of DI water for 3 times. Finally, the precipitate was dried in the vacuum desiccator for at least 5 days before further use.

Synthesis of $Pd_{17}Se_{15}$ Nanoparticles:

A slurry containing 0.1 mmol of complex **1**, in 10 mmol of trioctylphosphine (TOP), prepared in a three necked flask (100 mL) was heated to 100 °C to remove water and oxygen, The resulting homogeneous brown solution was heated to 195°C under N_2 and kept at the same temperature for 60 min, affording a dark colloidal solution. The solution was air-cooled and NPs of $Pd_{17}Se_{15}$ were precipitated with excess acetone. They were washed with acetone and dried in air at 60 °C.

Synthesis of Graphene Oxide Grafted with $Pd_{17}Se_{15}$ Nanoparticles:

In a typical synthesis, 100 mg of GO synthesized as above was completely dissolved in 20 mL of DI water. The 40 mg of $Pd_{17}Se_{15}$ prepared as above was dispersed in 20 mL of toluene and was added to GO solution. The mixture was stirred for 24 h at room temperature. The precipitate was separated and washed with acetone. The composite so obtained were labelled as GO–$Pd_{17}Se_{15}$ NPs.

Solubility and Stability of Ligand, Complex and GO-$Pd_{17}Se_{15}$ NPs:

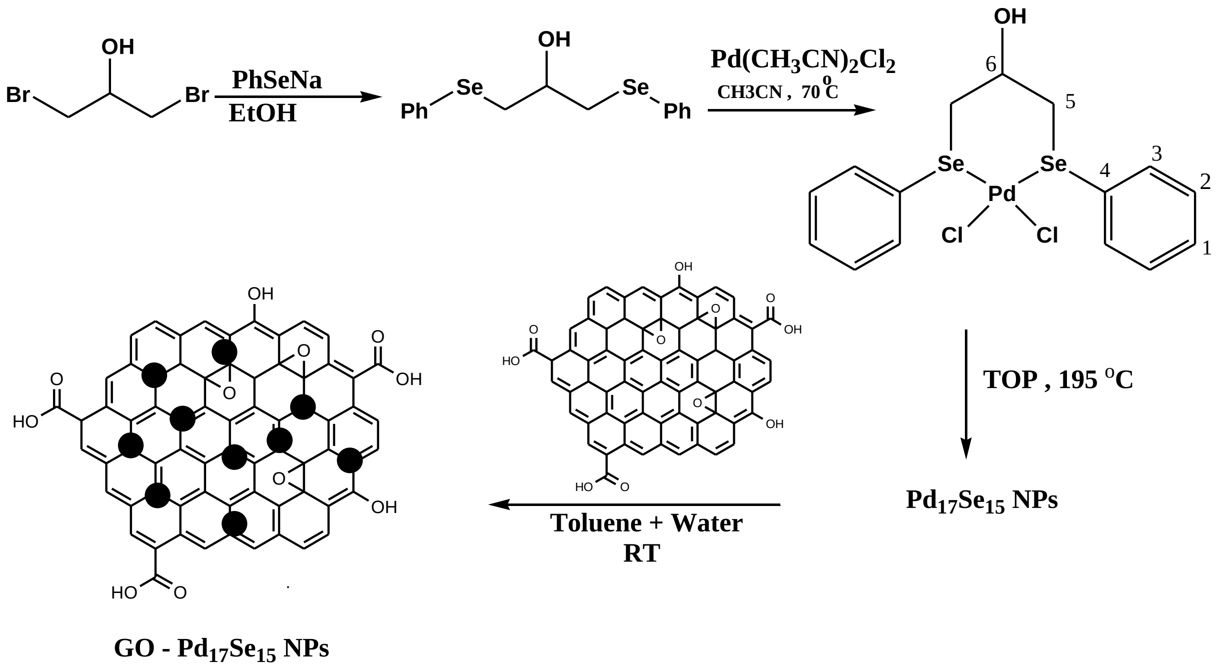
The ligands **L** was found soluble in common organic solvents. The complex **1** shows good solubility in DMF, DMSO, $PhCH_3$, CH_3CN, $CHCl_3$ and CH_2Cl_2. It has been found sparingly soluble in THF, and in CH_3OH, diethyl ether and hexane negligibly soluble. On the other hand the catalyst GO- $Pd_{17}Se_{15}$ NPs have been found sparingly soluble in DMF, DMSO, EtOH and H_2O and insoluble in $CHCl_3$, CH_3CN, CH_2Cl_2, diethyl ether, hexane and CH_3OH. The solution of catalyst in EtOH becomes turbid within 10-15 min. The ligand as well as its complex **1** may be stored under ambient conditions as they are moisture and air insensitive.

General Procedure for the C–O Coupling Reaction of Aryl/Heteroaryl Halides with Phenol Catalyzed with GO – $Pd_{17}Se_{15}$ NPs:

An oven-dried flask was charged with aryl halide (1.0 mmol), phenol (1.2 mmol), K_2CO_3 (3.0 mmol) and DMSO (4.0 ml). Catalyst GO–$Pd_{17}Se_{15}$ NPs (20 mg ;1.0 mol% Pd) in DMSO was added. The reaction was carried out at room temperature under aerobic conditions by stirring the reaction mixture until maximum conversion of aryl halide to product occurred. Thereafter reaction mixture was poured to 50 mL of water. The resulting mixture was extracted with ethylacetate (2 × 50 mL). The organic layer was washed with water (2 × 50 mL) and dried over anhydrous Na_2SO_4. The solvent of the extract was removed with rotary evaporator and the resulting residue was purified by flash column chromatography on silica gel using ethylacetate and hexane mixture as eluent.

Recyclability

To check recyclability of GO–$Pd_{17}Se_{15}$ NPs , after completion of the C-O cross-coupling of phenol with aryl halides and extraction of cross coupled product with EtOAc the GO–$Pd_{17}Se_{15}$ NPs present as residue were recovered from the aqueous solution by centrifugation and dried. They were reused for the fresh C-O cross-coupling of phenol with aryl halides.



Scheme S1. Synthesis of Pd(ll) complex and Graphene Oxide grafted with $Pd_{17}Se_{15}$ NPs

SEM–EDX Data:

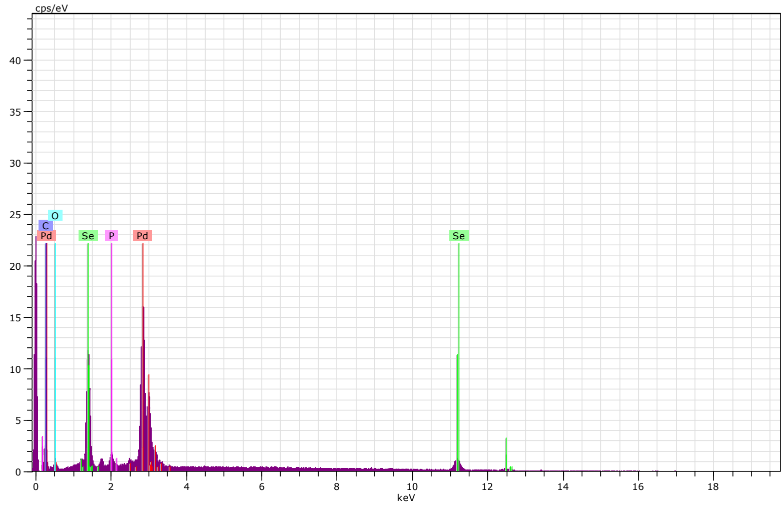


Fig. S1 SEM-EDX of $Pd_{17}Se_{15}$ NPs

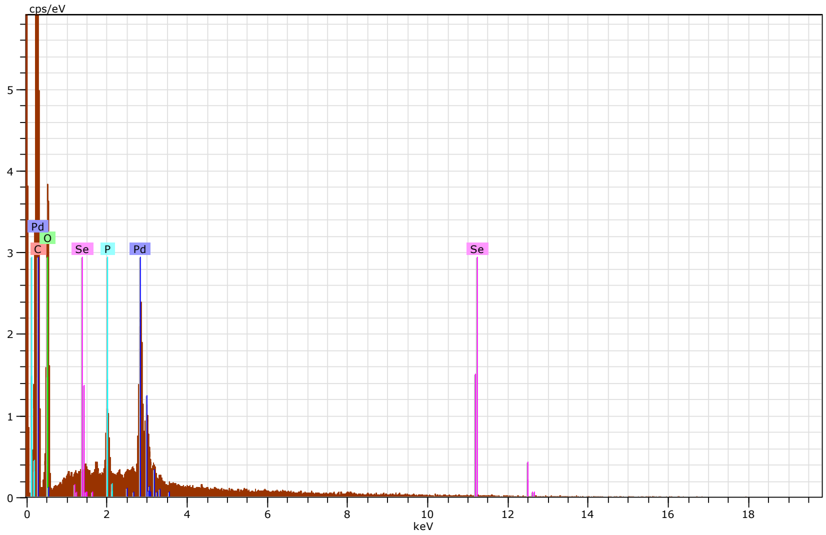


Fig. S2 SEM-EDX of GO–$Pd_{17}Se_{15}$ NPs

Powder–XRD Data

The powder X-ray diffraction pattern of $Pd_{17}Se_{15}$ nano-partiles (Fig. S4) was indexed on the basis of a primitive cubic unit cell[6] (JCPDS # 73-1424) with the refined lattice parameter = 10.60Å and d values (*hkl*): 3.32 (310), 3.17 (311), 2.92 (320), 2.81 (321), 2.56 (410), 2.49 (411), 2.42 (311), 2.36 (420), 2.30 (430), 2.11 (431), 2.06 (511), 2.03 (440), 1.86 (433), 1.76 (600), 1.71 (532), 1.65 (540), 1.63 (541). The diffraction pattern of GO has a peak centered at $2\ \theta = 11.8°$, corresponding to the [001] interlayer spacing of 7.46 Å.[7] The XRD pattern of GO– $Pd_{17}Se_{15}$ NPs (fig. S5) shows clearly diffraction peaks of $Pd_{17}Se_{15}$, which are without any change in comparison to that of $Pd_{17}Se_{15}$. However, the [001] reflections of GO are not observed in the XRD pattern of GO– $Pd_{17}Se_{15}$ NPs sample because the regular stack of GO was destroyed by the intercalation of $Pd_{17}Se_{15}$ NPs.[7, 8] The XRD analysis further confirms that $Pd_{17}Se_{15}$ NPs have been effectively intercalated into the GO stacks.

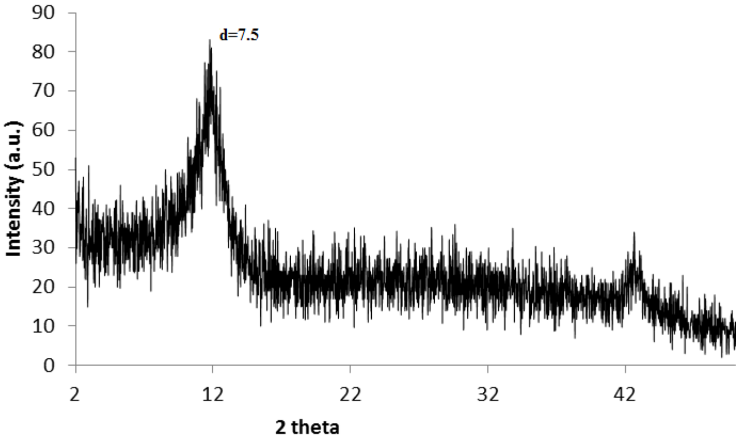


Fig. S3 PXRD of Graphene oxide

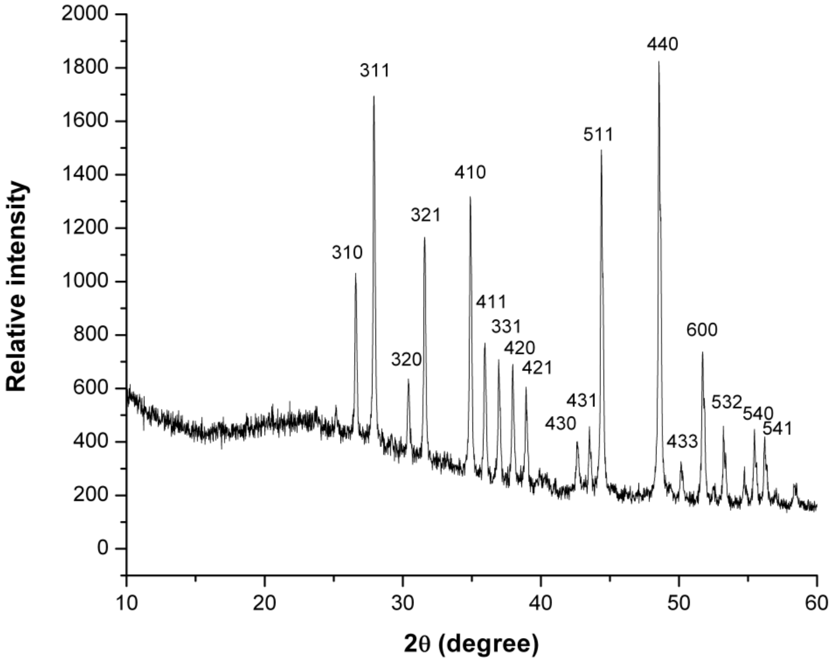


Fig. S4 PXRD of $Pd_{17}Se_{15}$ NPs

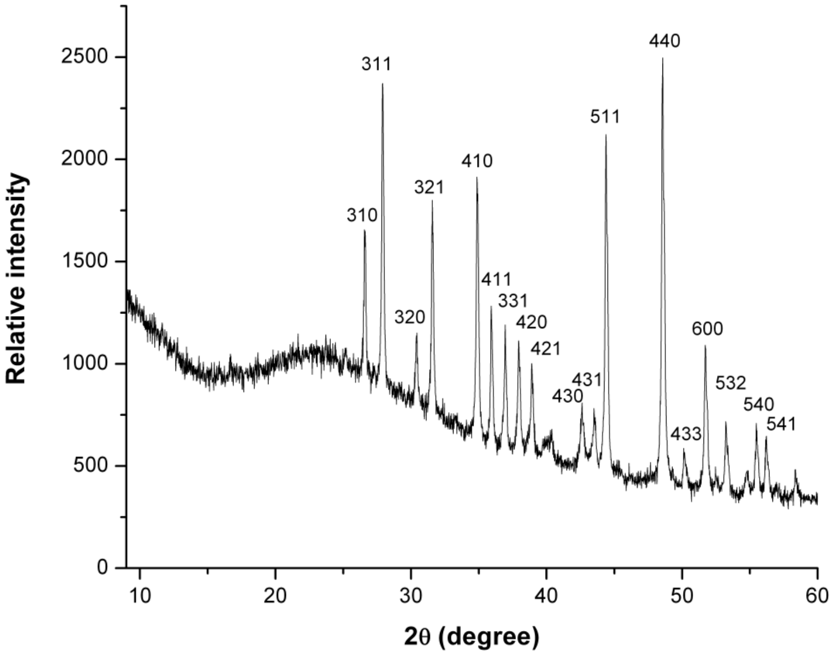


Fig. S5 PXRD of GO–$Pd_{17}Se_{15}$ NPs

TEM images of GO–$Pd_{17}Se_{15}$ NPs after 5th Run:

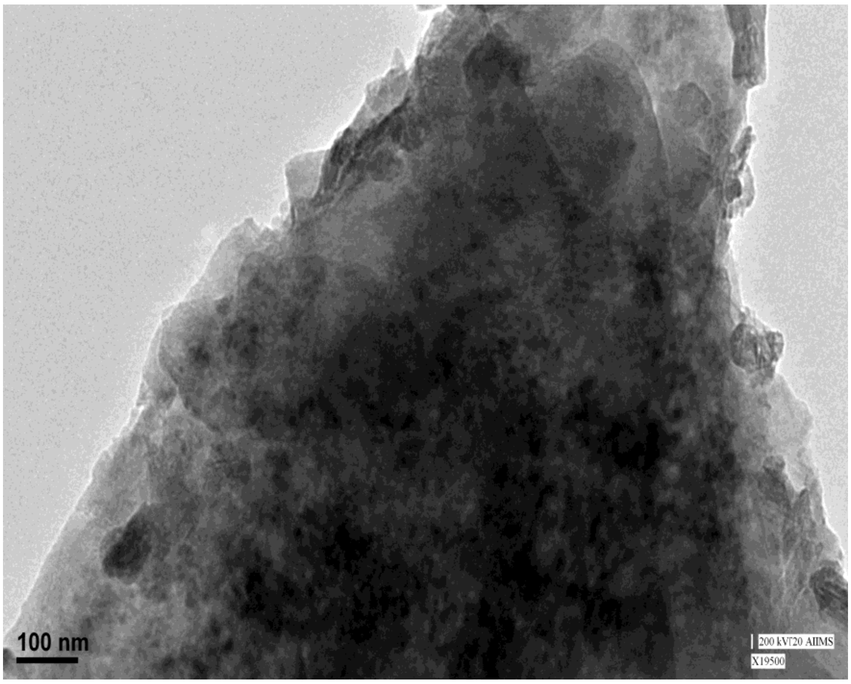


Fig. S6 TEM images of GO–$Pd_{17}Se_{15}$ NPs after 5th Run at 100 nm scale bar

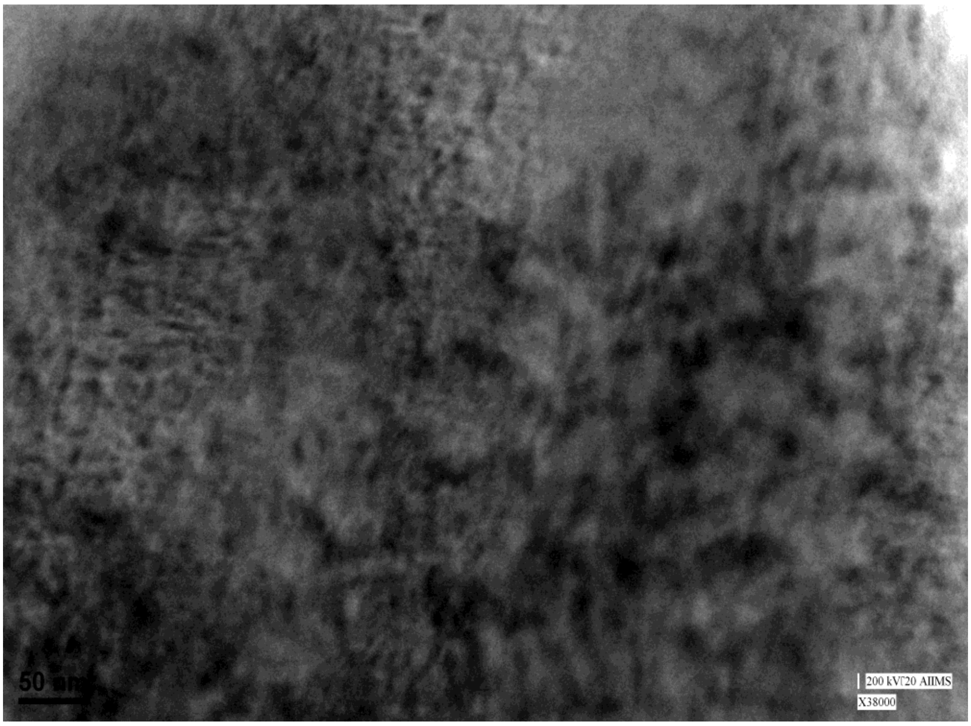


Fig. S7 TEM images of GO–$Pd_{17}Se_{15}$ NPs after 5th Run at 50 nm scale bar

Crystal data

Table T1. Structural refinement parameters of **1**.

Compounds	**1**
Empirical formula	$C_{17}H_{19}Cl_2NOPdSe_2$
Formula wt.	588.55
Crystal size [mm]	0.35×0.24×0.23
Crystal system	Monoclinic
Space group	*P2(1)/n*
Unit Cell dimension	*a* = 15.652 (9)Å *b* = 08.153(5)Å *c* = 16.180(10)Å α = 90.00° β = 94.451(10)° γ = 90.00°

Volume [Å^3]	2058(2)
Z	4
Density (Calc.) [Mg·m^{-3}]	1.899
Absorption coeff. [mm^{-1}]	4.700
F(000)	1136.0
θ range [°]	2.53–24.47
Index ranges	$-18 \leq h \leq 18$ $-09 \leq k \leq 09$ $-19 \leq l \leq 19$
Reflections collected	15028
Independent reflections ($R_{int.}$)	3462 (0.0793)
Max./min. Transmission	0.342/0.226
Data/restraints/parameters	3462/0/219
Goodness-of-fit on F^2	0.930
Final R indices [$I > 2\sigma(I)$]	R_1 = 0.0524, wR_2 = 0.1210
R indices (all data)	R_1 = 0.0784, wR_2 = 0.1344
Largest diff. peak/hole [e.Å^{-3}]	1.090/–1.570

Table T2. Selected bond lengths [Å] and bond angles [°] of complex **1**

Bond length [Å]	Bond angle [°]
Pd(1)—Se(1) 2.389(16)	Se(1)–Pd(1)–Se(2) 101.05(3)
Pd(1)—Se(2) 2.386(14)	Se(1)–Pd(1)–Cl(1) 84.21(6)
Pd(1)—Cl(1) 2.327(2)	Se(1)–Pd(1)–Cl(2) 174.46(6)
Pd(1)—Cl(2) 2.321(2)	Se(2)–Pd(1)–Cl(1) 174.29(6)
O(1)—C(8) 1.450(8)	Se(2)–Pd(1)–Cl(2) 82.58(6)
Se(1)—C(6) 1.943(7)	Cl(1)–Pd(1)–Cl(2) 92.34(8)
Se(1)—C(7) 1.925(7)	C(7)–C(8)–O(1) 105.2(6)
Se(2)—C(9) 1.961(7)	C(9)–C(8)–O(1) 106.5(6)
Se(2)—C(10) 1.936(8)	C(6)–Se(1)–C(7) 99.6(3)
C(7)—C(8) 1.504(10)	C(9)–Se(2)–C(10) 96.7(3)
C(8)—C(9) 1.510(10)	C(1)–C(6)–Se(1) 122.4(6)
	C(11)–C(10)–Se(2) 124.6(6)

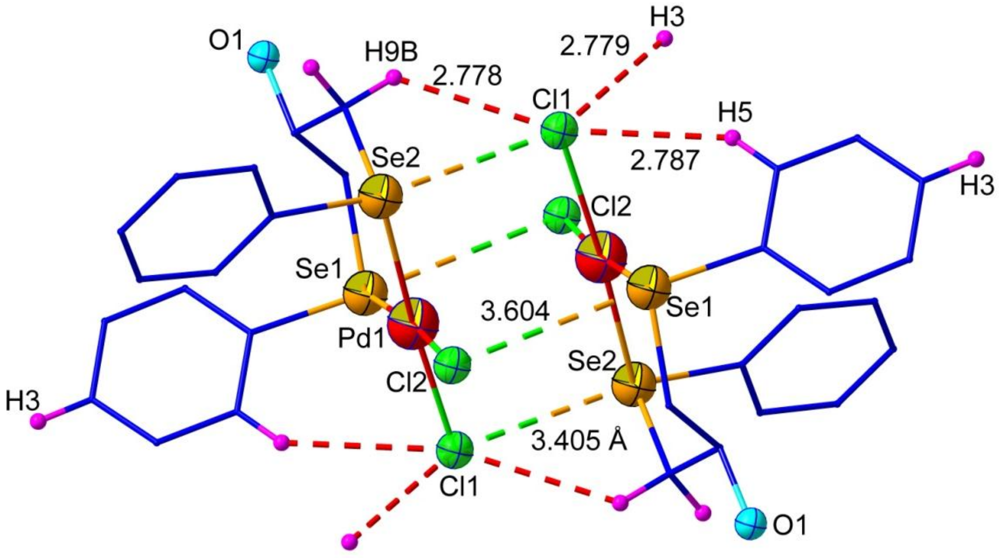


Figure S7. Inter and intra-molecular Cl···H−C and Cl···Se interactions in **1**.

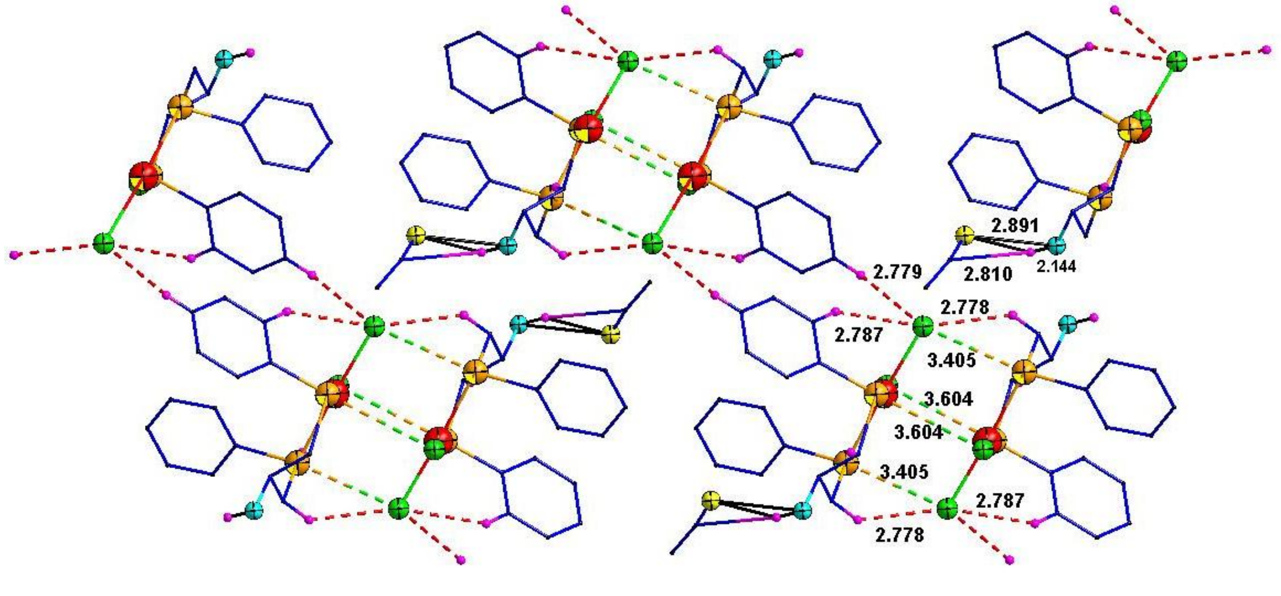
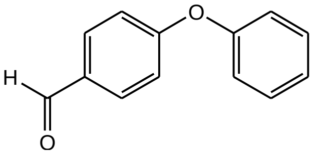
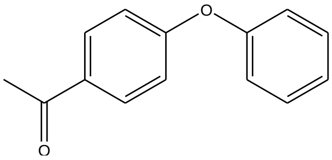


Figure S8. Inter and intra-molecular Cl···H, Cl···Se and OH…CH_3CN interactions in **1**.



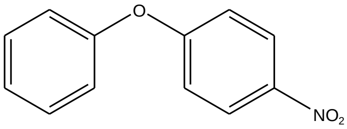
4-phenoxybenzaldehyde:[9]

Yellow liquid. ^{1}H NMR (300 MHz, CDCl3): 9.92 (s, 1H), 7.84-7.86 (d, 2H), 7.40-7.45 (t, 2H), 7.20-7.26 (m, 1H), 7.05-7.11 (t, 4H).



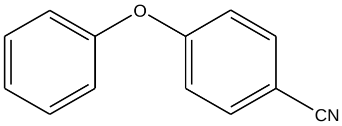
1-(4-phenoxyphenyl)ethanone:[9]

White Solid. ^{1}H NMR (300 MHz, CDCl3): 7.91-7.96 (d, 2H), 7.36-7.42 (t, 2H), 7.19-7.22 (t, 1H), 7.06-7.08 (d, 2H), 6.97-7.02 (d, 2H), 2.57 (s, 3H).



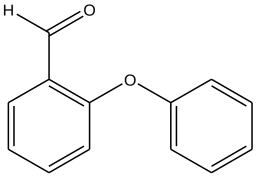
1-Nitro-4-phenoxybenzene:[10]

Yellow Solid. ^{1}H NMR (300 MHz, CDCl3): 8.11-8.14 (d, 2H), 7.34-7.40 (t, 2H), 7.16-7.21 (t, 1H), 7.01-7.03 (d, 2H), 6.92-6.95 (d, 2H).



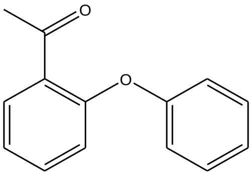
4-phenoxybenzonitrile:[9]

White Solid. ^{1}H NMR (300 MHz, CDCl3): 7.49-7.55 (m, 2H), 7.30-7.35 (t, 2H), 7.11-7.17 (t, 1H), 6.96-6.98 (d, 2H), 6.90-6.93 (d, 2H).



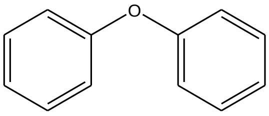
2-phenoxybenzaldehyde:[9]

Yellow liquid. ^{1}H NMR (300 MHz, CDCl3): 10.45 (s, 1H), 7.85-7.88 (d, 1H), 7.41-7.47 (t, 1H), 7.30-7.35 (t, 2H), 7.10-7.14 (t, 2H), 6.98-7.01 (d, 2H), 6.81-6.84 (d, 1H).



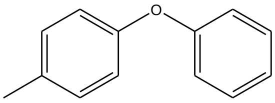
1-(2-phenoxyphenyl)ethanone:[10]

Colorless oil. ^{1}H NMR (300 MHz, CDCl3): 7.83-7.86 (d, 1H), 7.35-7.45 (m, 3H), 7.15-7.20 (m, 2H), 7.01-7.03 (d, 2H) 6.90-6.92 (d, 2H) 2.64 (s, 3H).



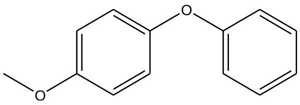
Diphenyl ether:[10]

Colorless liquid. ^{1}H NMR (300 MHz, CDCl3): 7.24-7.28 (t, 4H), 7.02-7.05 (t, 2H), 6.93-6.95 (d, 4H).



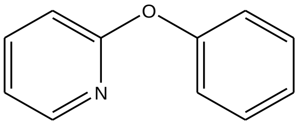
1-Methyl-4-phenoxybenzene:[10]

Colorless liquid. ^{1}H NMR (300 MHz, CDCl3): 7.46-7.48 (m, 2H), 7.23-7.26 (t, 2H), 7.06-7.07 (m, 1H), 6.98-7.04 (m, 2H), 6.89-6.91 (m, 2H), 2.26 (s, 3H).



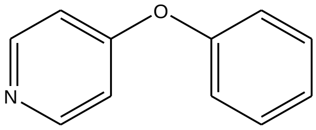
1-Methoxy-4-phenoxybenzene:[9]

Colorless liquid. ^{1}H NMR (300 MHz, CDCl3): 7.25-7.32 (m, 2H), 7.01-7.06 (t, 1H), 6.93-7.01 (m, 4H), 6.86-6.90 (m, 2H), 3.81 (s, 3H).



2-phenoxypyridine:[10]

Colorless oil. ^{1}H NMR (300 MHz, CDCl3): 8.12-8.13 (m, 1H), 7.58-7.62 (t, 1H), 7.31-7.35 (t, 2H), 7.05-7.18 (m, 3H), 6.90-6.93 (t, 1H), 6.81-6.84 (d, 1H).



4-phenoxypyridine:[11]

Colorless oil. ^{1}H NMR (300 MHz, CDCl3): 8.45-8.47 (d, 2H), 7.41-7.47 (t, 2H), 7.20-7.26 (m, 1H), 7.09-7.12 (d, 2H), 6.85-6.91 (m, 2H).

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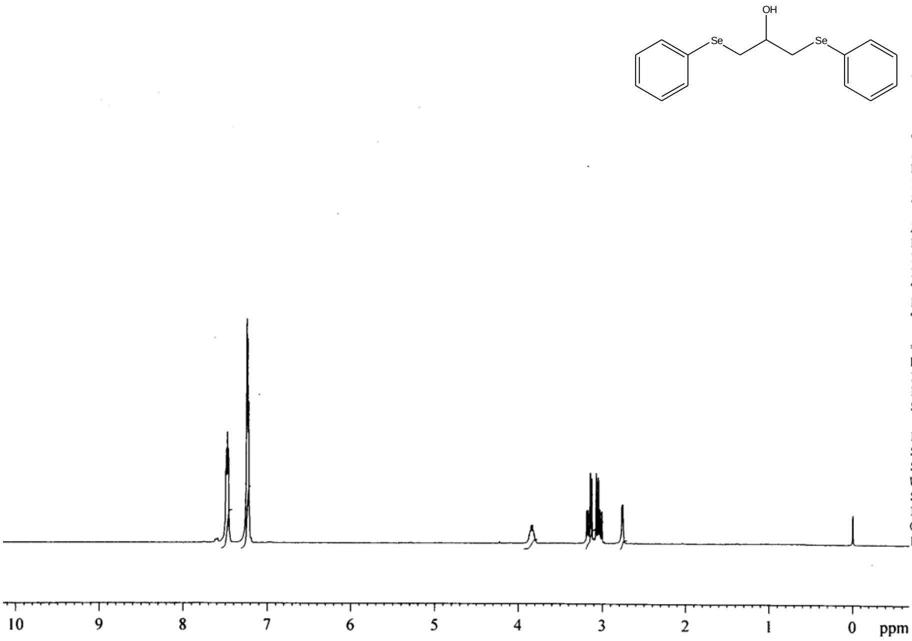
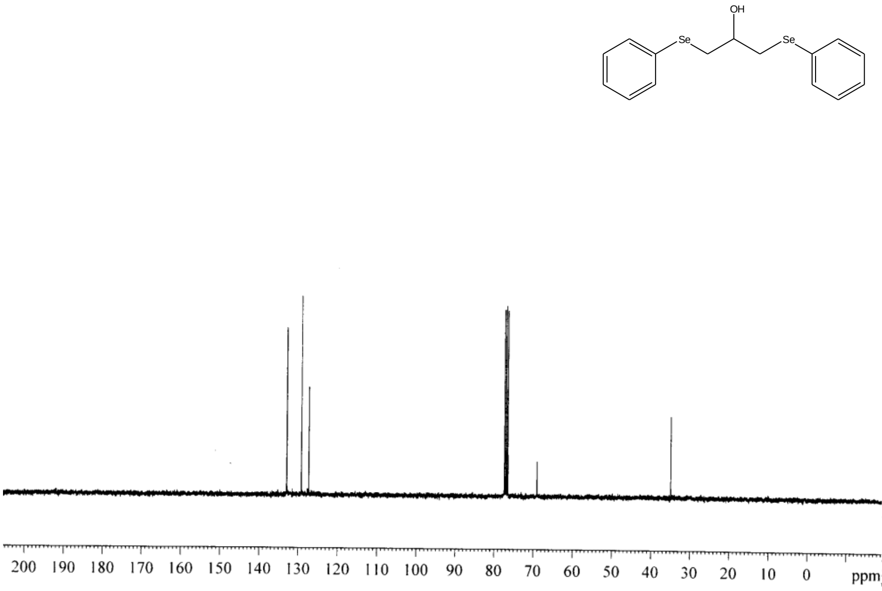


```
Current Data Parameters
NAME        July-07-2012
EXPNO                 21
PROCNO                 1

F2 - Acquisition Parameters
Date_           20120708
Time               16.20
INSTRUM            av300
PROBHD   5 mm PABBO BB-
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                     5
DS                     2
SWH             6172.839 Hz
FIDRES          0.094190 Hz
AQ             5.3084660 sec
RG                 645.1
DW                81.000 usec
DE                  6.00 usec
TE                 300.0 K
D1            1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                 14.75 usec
PL1                -2.00 dB
SFO1         300.1318534 MHz

F2 - Processing parameters
SI                 32768
SF           300.1300091 MHz
WDW                   EM
SSB                    0
LB                  0.30 Hz
GB                     0
PC                  1.00
```



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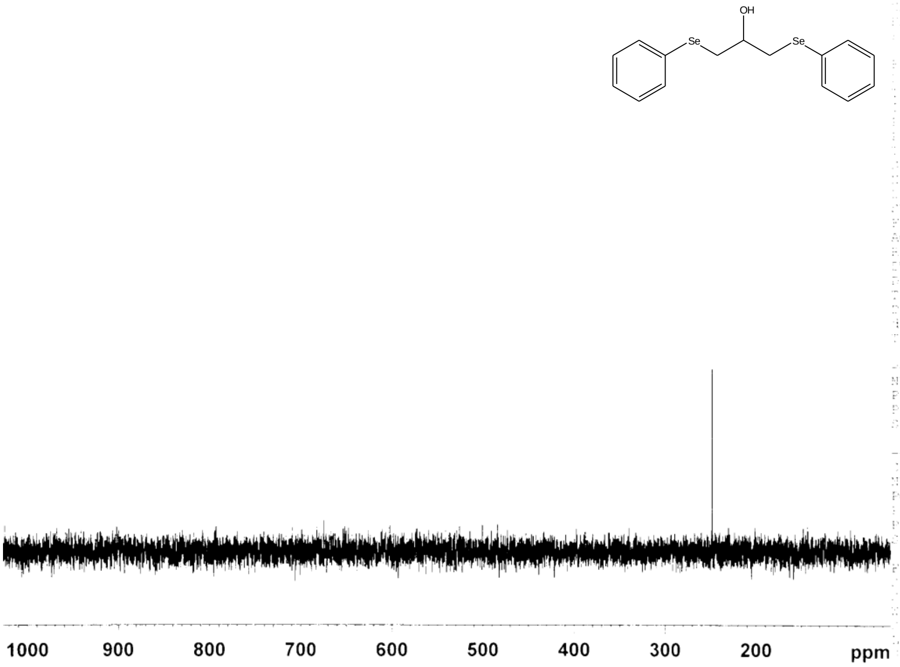
Current Data Parameters
NAME        July-07-2012
EXPNO                 22
PROCNO                 1

F2 - Acquisition Parameters
Date_           20120708
Time               16.23
INSTRUM            av300
PROBHD   5 mm PABBO BB-
PULPROG           zgpg30
TD                 65536
SOLVENT            CDCl3
NS                   254
DS                     4
SWH            17985.611 Hz
FIDRES          0.274439 Hz
AQ             1.8219508 sec
RG                 32768
DW                27.800 usec
DE                  6.00 usec
TE                 300.0 K
D1            2.00000000 sec
d11           0.03000000 sec
DELTA         1.89999998 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                 13C
P1                  9.00 usec
PL1                -2.00 dB
SFO1          75.4752953 MHz

======== CHANNEL f2 ========
CPDPRG2           waltz16
NUC2                  1H
PCPD2              80.00 usec
PL2                -2.00 dB
PL12               12.69 dB
PL13               12.69 dB
SFO2         300.1312005 MHz

F2 - Processing parameters
SI                 32768
SF            75.4677516 MHz
```



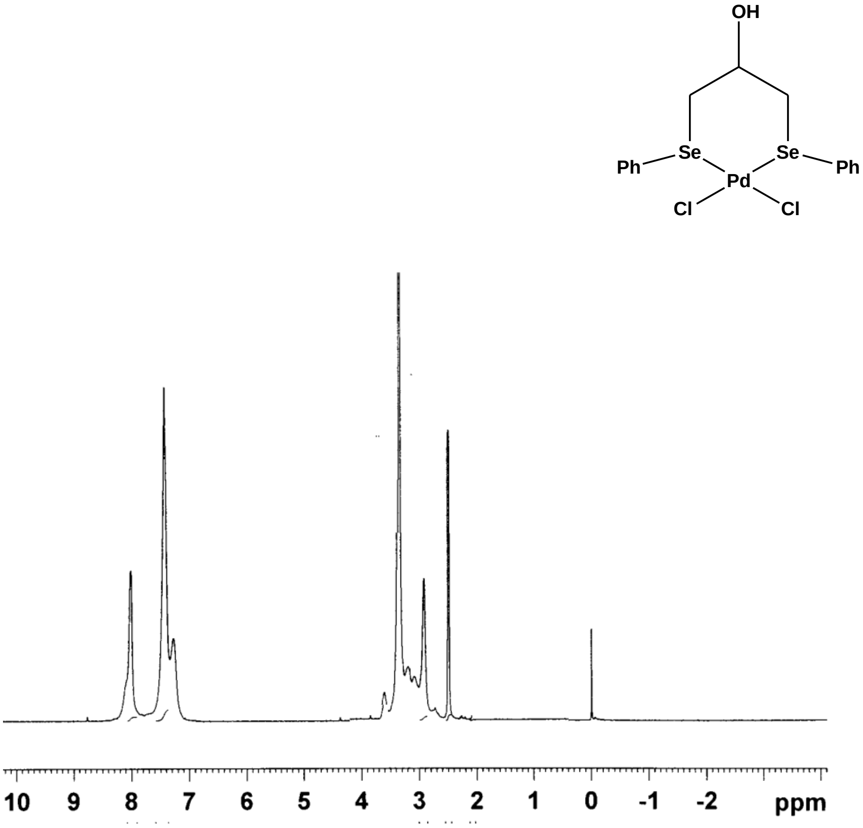
```
[illegible]
NAME        [illegible]
EXPNO       [illegible]
PROCNO      [illegible]

F2 - Acquisition Parameters
Date_       [illegible]
Time        [illegible]
INSTRUM     [illegible]
PROBHD      [illegible]
PULPROG     [illegible]
TD          [illegible]
SOLVENT     [illegible]
NS          [illegible]
DS          [illegible]
SWH           57142.855 Hz
FIDRES        [illegible] Hz
AQ            [illegible] sec
RG              32768
DW              8.750 usec
DE               6.00 usec
TE              300.0 K
D1         2.00000000 sec
D11        0.03000000 sec
TD0                 1

======== CHANNEL f1 ========
NUC1              77Se
P1               10.00 usec
PL1              -2.00 dB
SFO1        57.2708140 MHz

======== CHANNEL f2 ========
CPDPRG2         waltz16
NUC2                 1H
PCPD2             80.00 usec
PL2               -1.00 dB
PL12              16.23 dB
SFO2        [illegible] MHz

F2 - Processing parameters
SI                32768
SF          [illegible] MHz
WDW                  EM
SSB         [illegible]
LB                 4.00 Hz
GB          [illegible]
PC          [illegible]
```

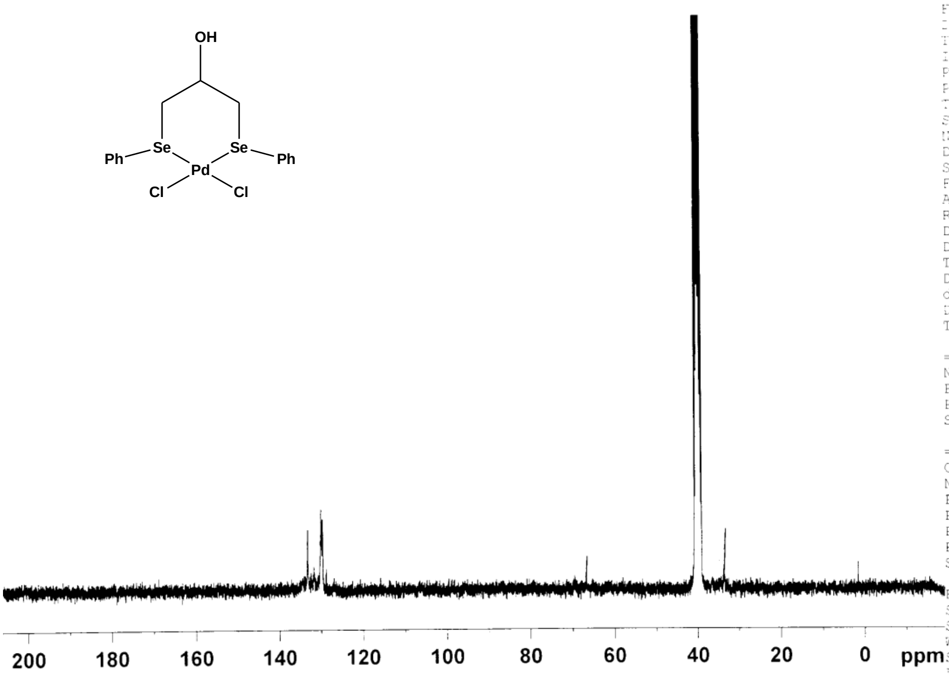


```
Current Data Parameters
NAME                 om
EXPNO                60
PROCNO                1

F2 - Acquisition Parameters
Date_          20110828
Time              22.29
INSTRUM           av300
PROBHD   5 mm PABBO BB-
PULPROG            zg30
TD                65536
SOLVENT            DMSO
NS                   40
DS                    0
SWH            6172.839 Hz
FIDRES         0.094190 Hz
AQ            5.3084660 sec
RG                203.2
DW               81.000 usec
DE                 6.00 usec
TE                300.0 K
D1           1.00000000 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 1H
P1                10.70 usec
PL1               -2.00 dB
SFO1        300.1318534 MHz

F2 - Processing parameters
SI                32768
SF          300.1300010 MHz
WDW                  EM
SSB                   0
LB                 0.30 Hz
GB                    0
PC                 1.00
```



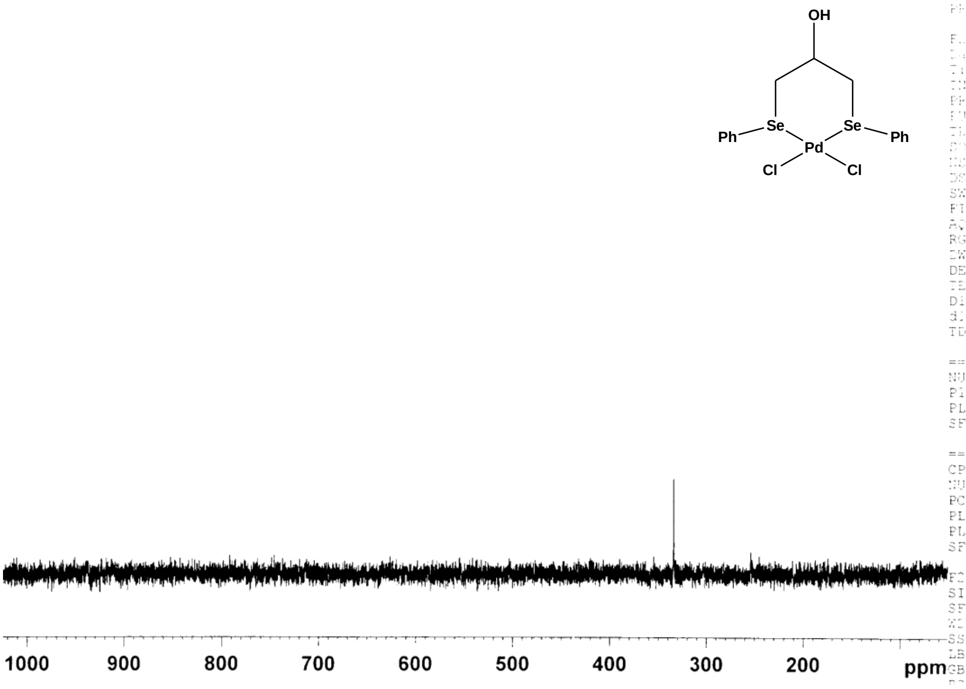
```
EXPNO
PROCNO

F2 - Acquisition Parameters
Date_
Time
INSTRUM                     av300
PROBHD    5 mm PABBO BB-
PULPROG                    zgpg30
TD                          65536
SOLVENT                      DMSO
NS                          10232
DS                              4
SWH                     17985.611 Hz
FIDRES                   0.274439 Hz
AQ                      1.8219508 sec
RG                          32768
DW                         27.800 usec
DE                           6.00 usec
TE                          300.0 K
D1                     2.00000000 sec
d11                    0.03000000 sec
DELTA                  1.89999998 sec
TD0                             1

======== CHANNEL f1 ========
NUC1                          13C
P1                           8.30 usec
PL1                         -2.00 dB
SFO1                   75.4752953 MHz

======== CHANNEL f2 ========
CPDPRG2                   waltz16
NUC2                           1H
PCPD2                       80.00 usec
PL2                         -2.00 dB
PL12                        15.80 dB
PL13                        19.80 dB
SFO2                  300.1312005 MHz

F2 - Processing parameters
SI                          32768
SF                     75.4677490 MHz
WDW                            EM
SSB                             0
LB                           1.00 Hz
```



```
Current Data Parameters
NAME
EXPNO
PROCNO

F2 - Acquisition Parameters
Date_
Time
INSTRUM
PROBHD    5 mm PABBO BB-
PULPROG
TD                          65536
SOLVENT                      DMSO
NS                           4824
DS                              4
SWH                     57142.855 Hz
FIDRES                   0.871931 Hz
AQ                      0.5734900 sec
RG                          32768
DW                          8.750 usec
DE                           6.00 usec
TE                          300.0 K
D1                     2.00000000 sec
d11                    0.03000000 sec
TD0                             1

======== CHANNEL f1 ========
NUC1                         77Se
P1                          10.00 usec
PL1                         -2.00 dB
SFO1                   57.2706140 MHz

======== CHANNEL f2 ========
CPDPRG2                   waltz16
NUC2                           1H
PCPD2                       80.00 usec
PL2                         -1.00 dB
PL12                        16.23 dB
SFO2                  300.1312000 MHz

F2 - Processing parameters
SI                          32768
SF                     57.2393320 MHz
WDW                            EM
SSB                             0
LB                           4.00 Hz
GB                              0
```