

Synthesis and Photoelectric Properties of Ir^{III} Complexes Using Fluorobenzylimidazole[2,1-b]thiazole Derivatives as Primary Ligands

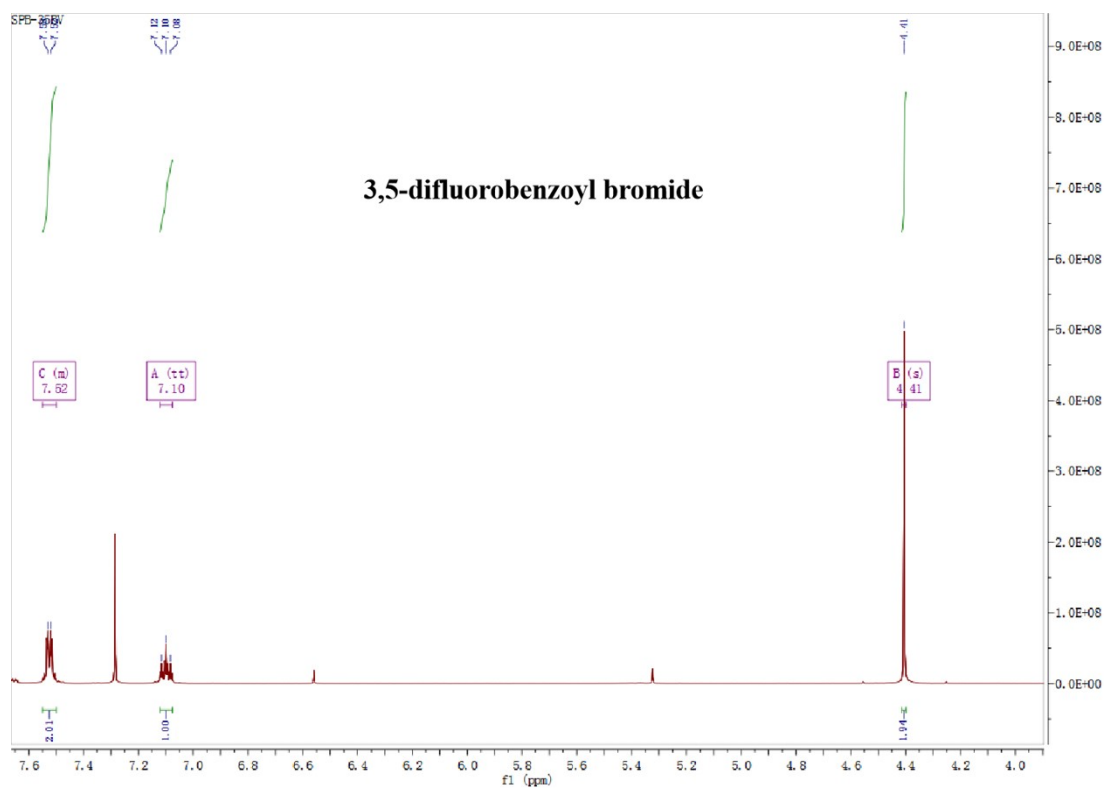
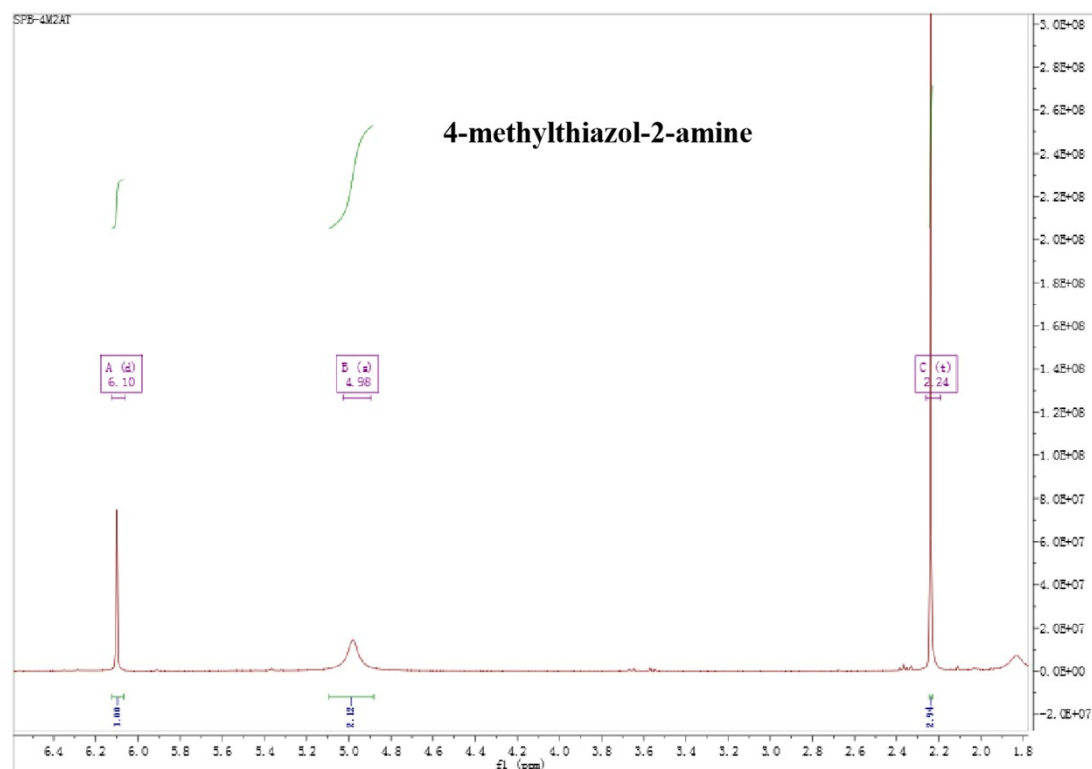
Peng-bin Si,^a Hai-feng Zhe,^b Ai-hui Zhou,^a Xiao-qing Liu,^a Ming-yu Teng,^{*a} Mei-zhu Rong,

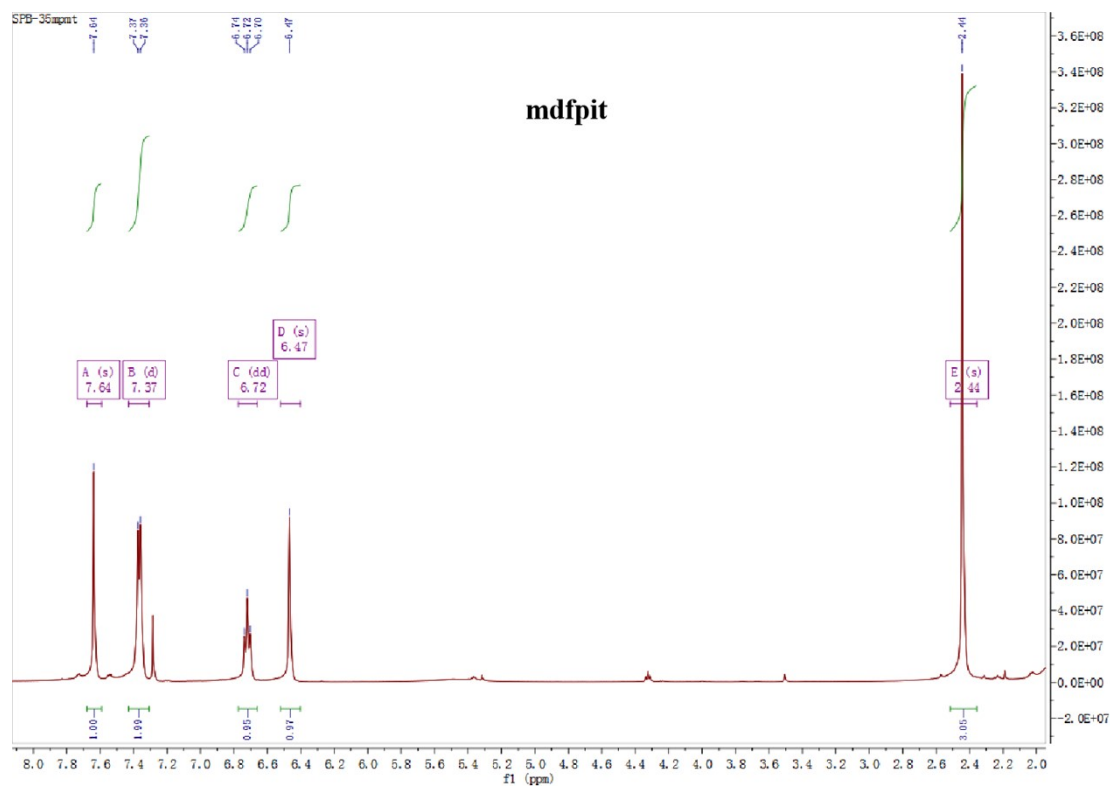
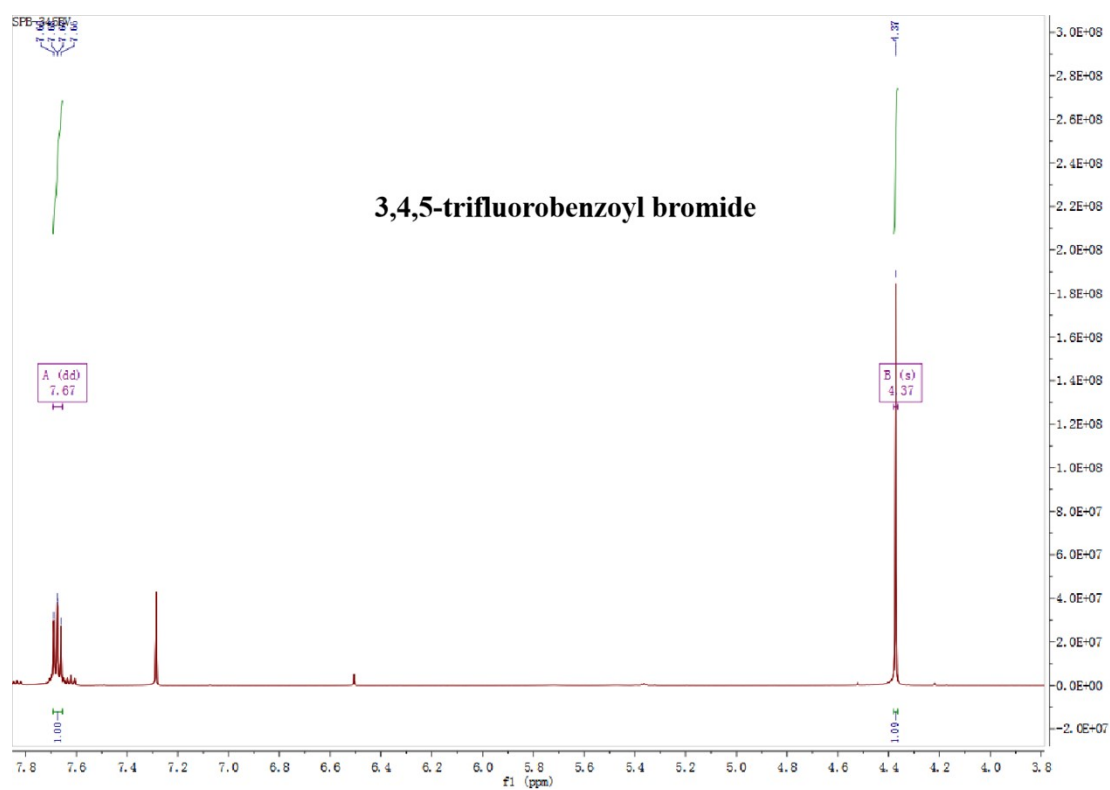
^a Yu-fei Wang,^a Qin Wang,^{*a} Zheng-liang Wang^{*b} and Jie Zhang^{*c}

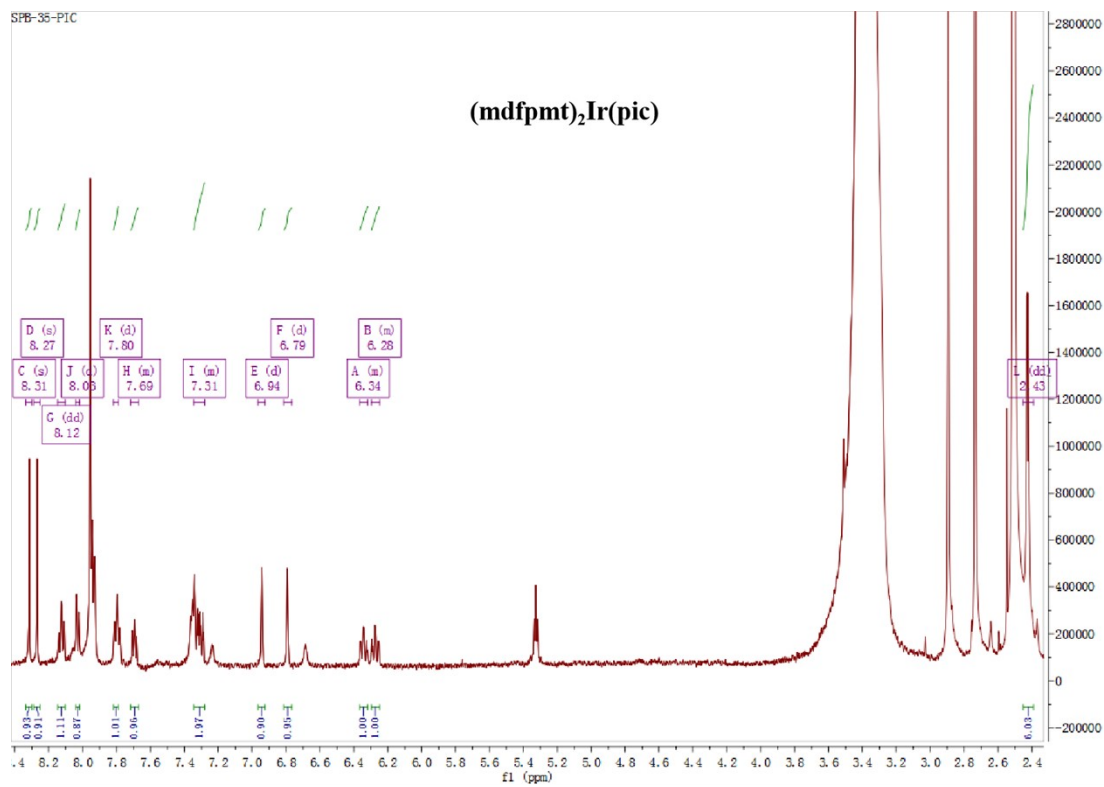
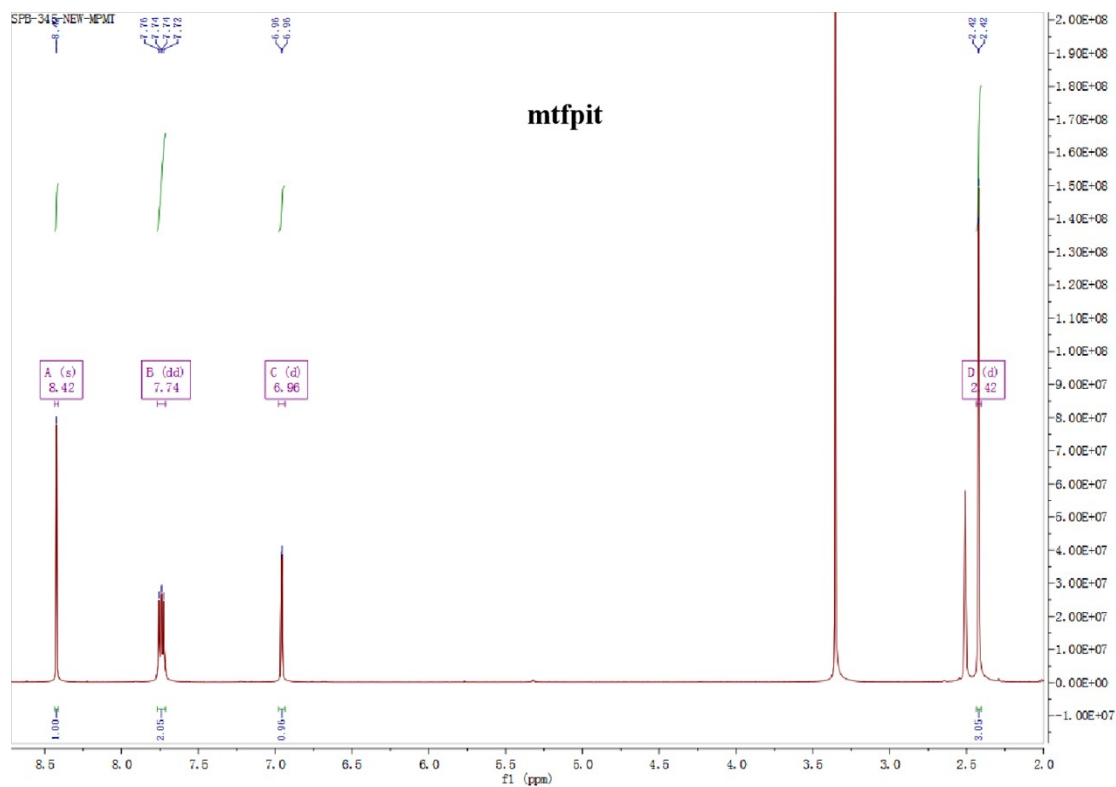
Electronic Supplementary Information

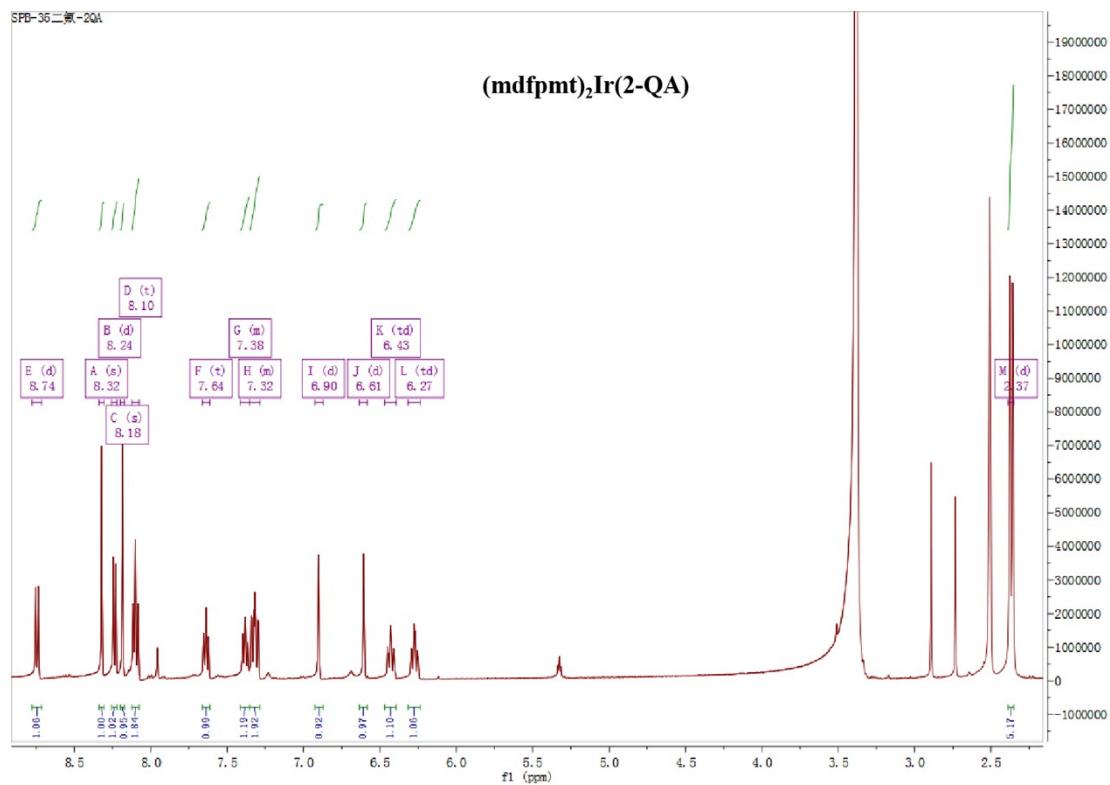
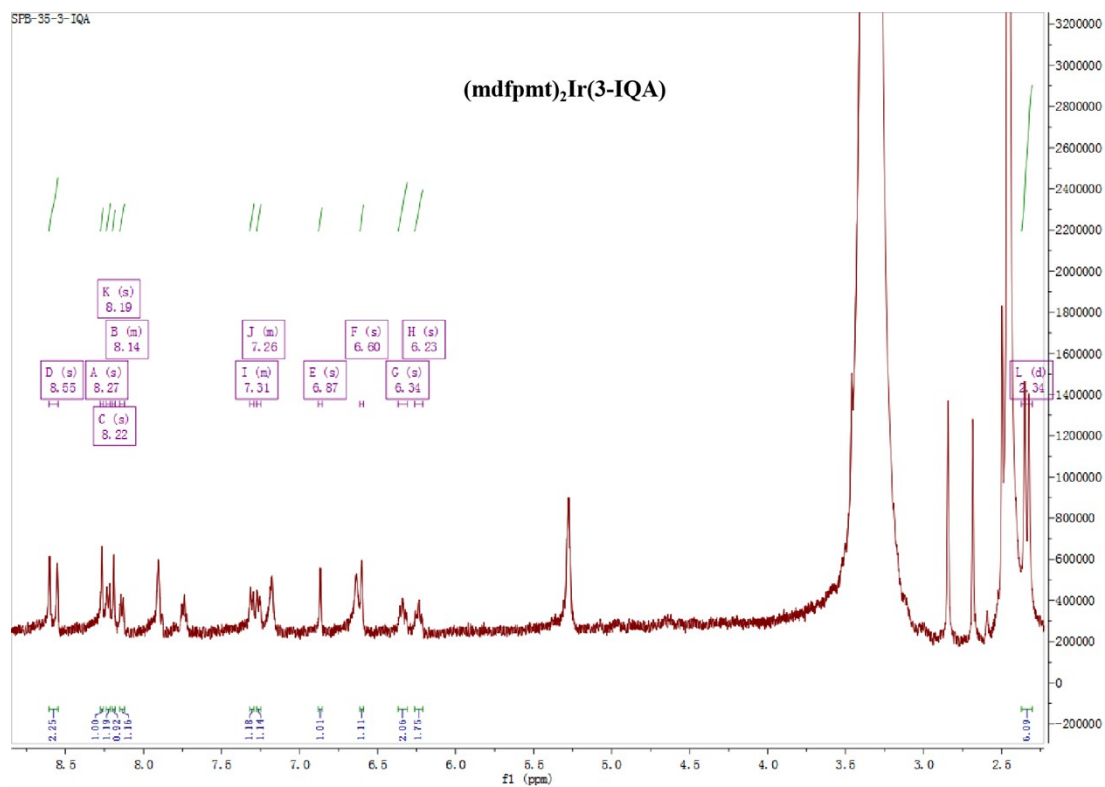
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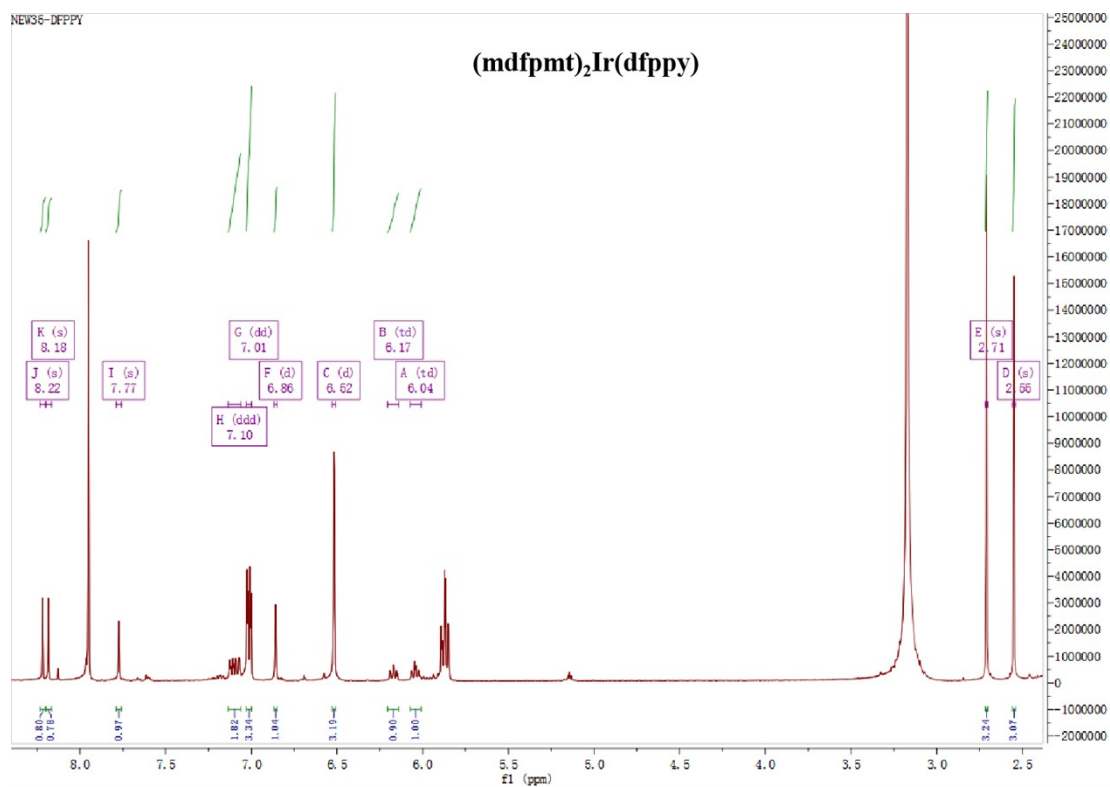
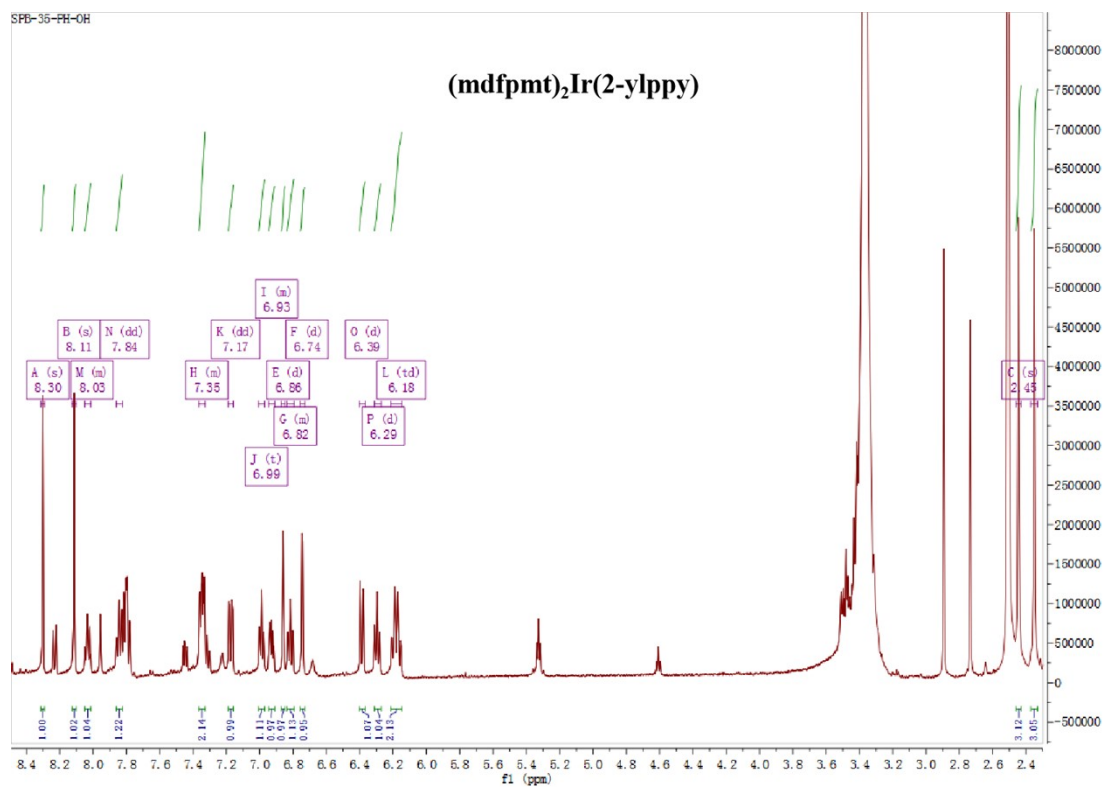
1 ^1H NMR spectra for the Ir^{III} complexes and primary ligands:

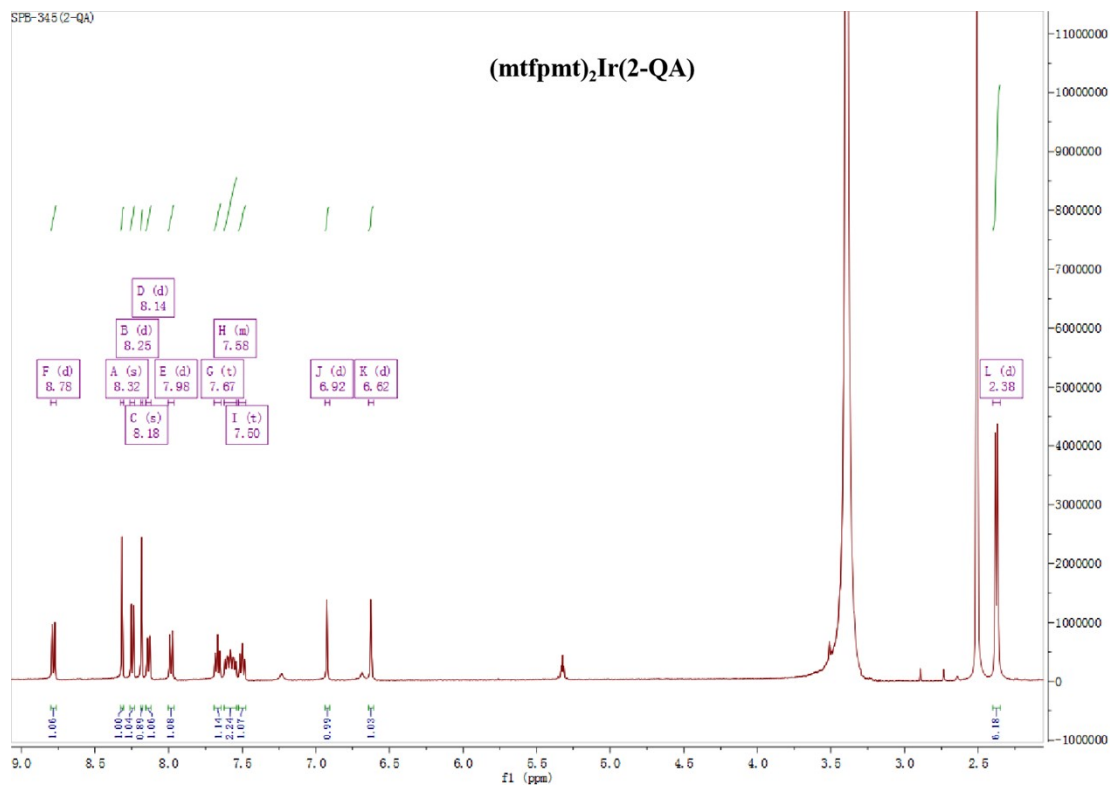
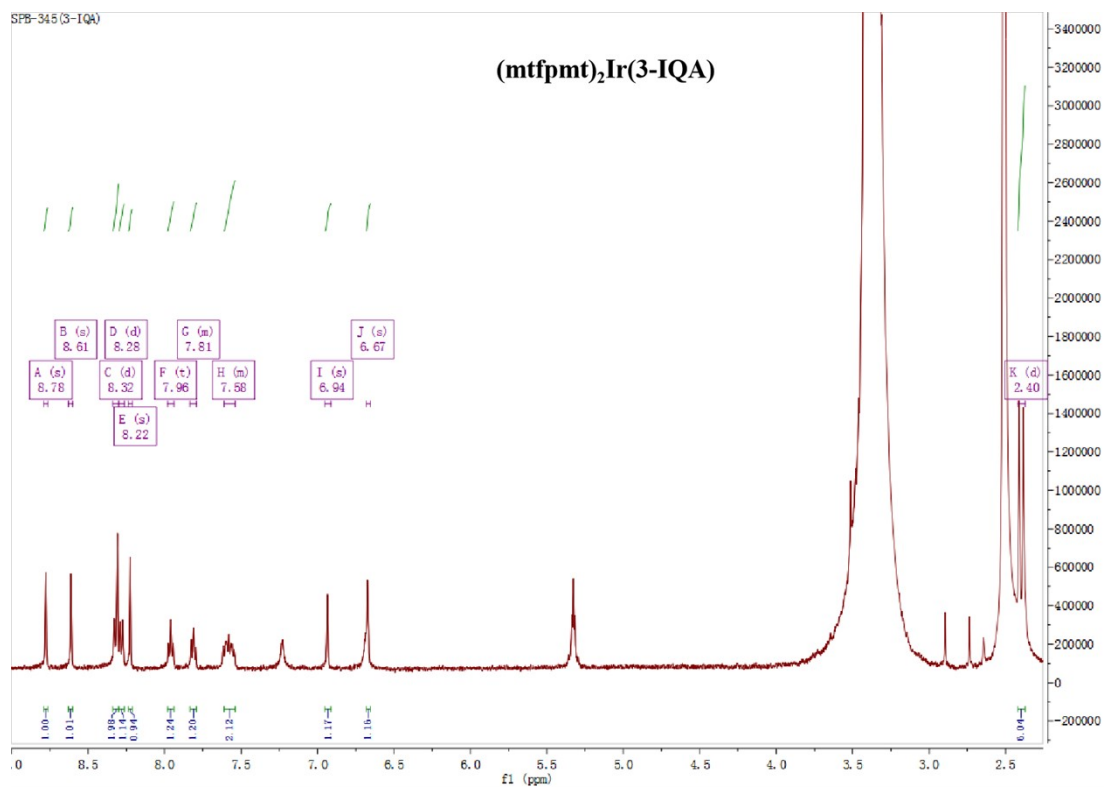


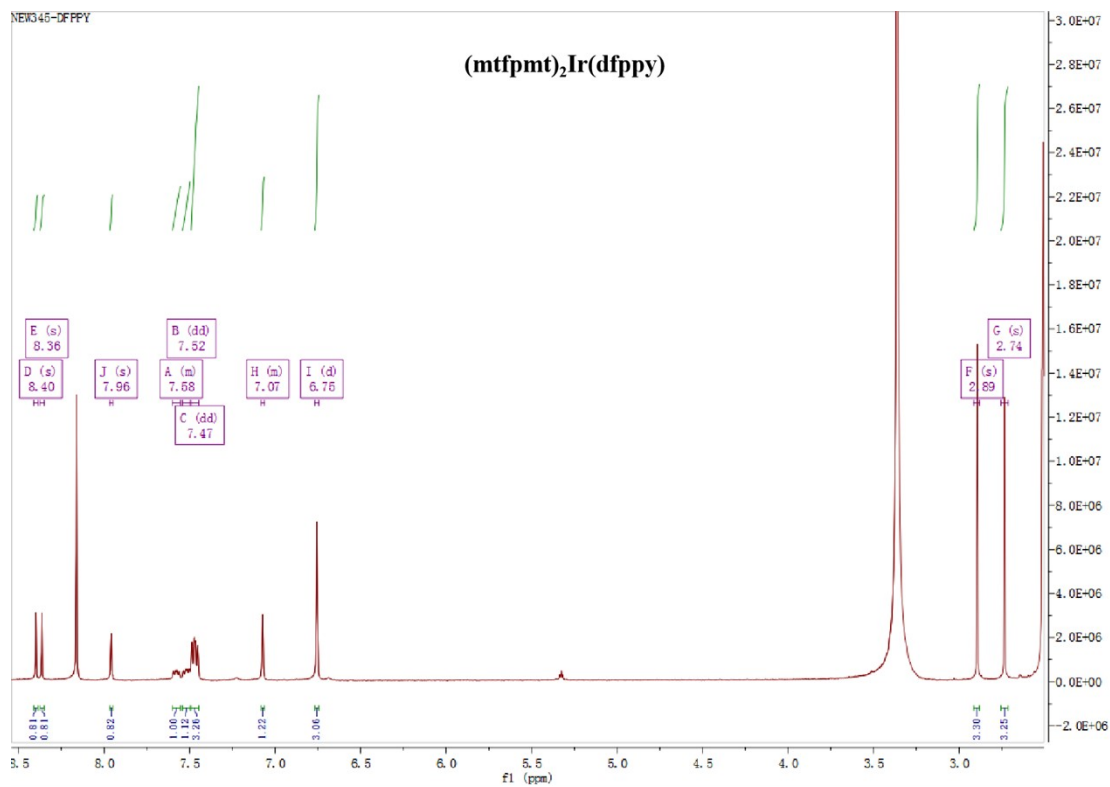
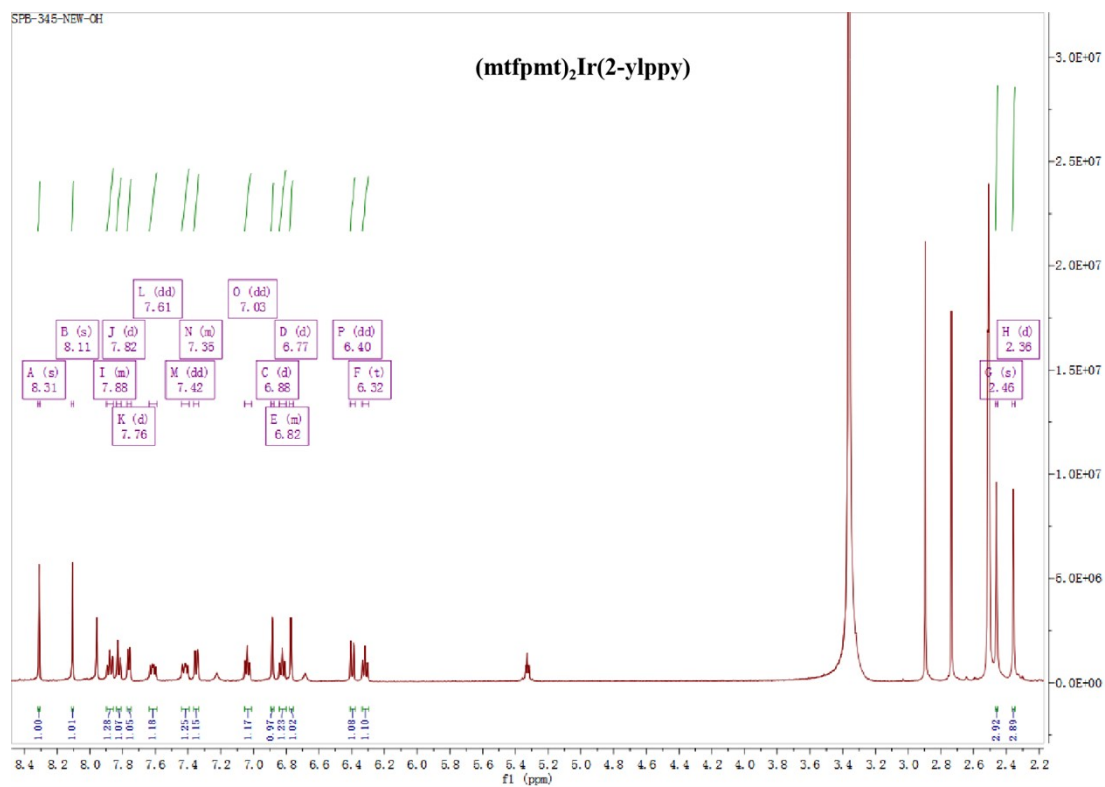


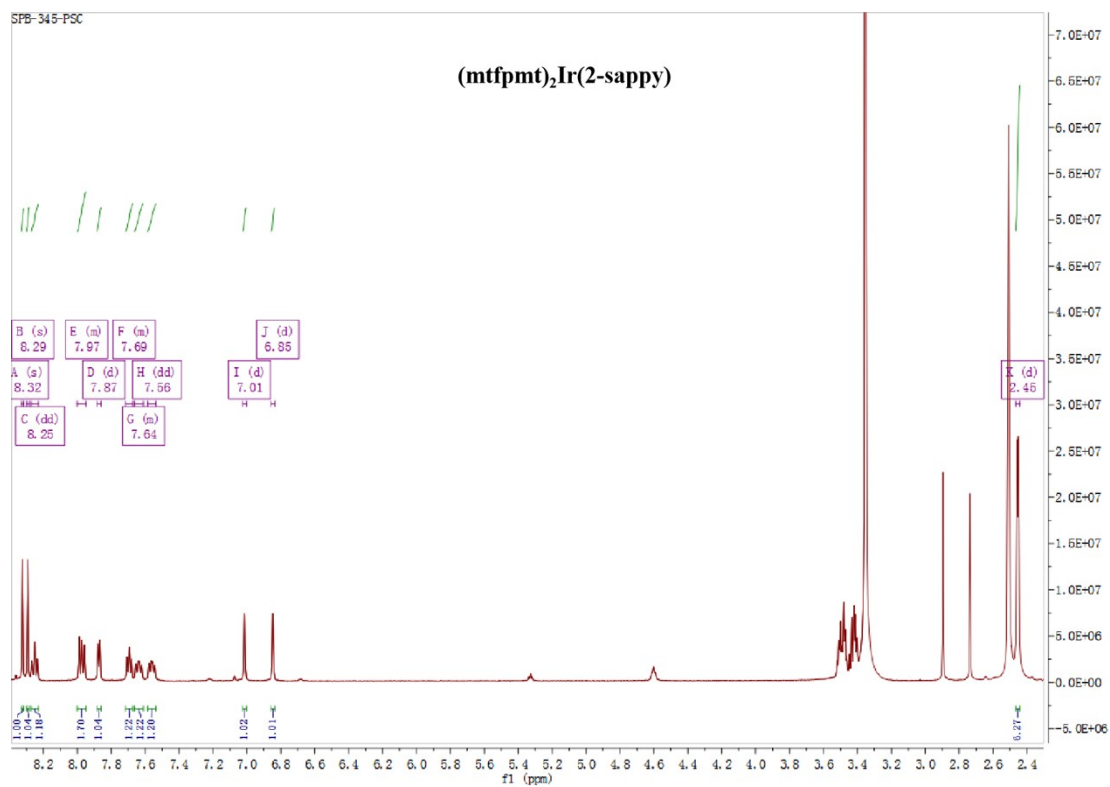




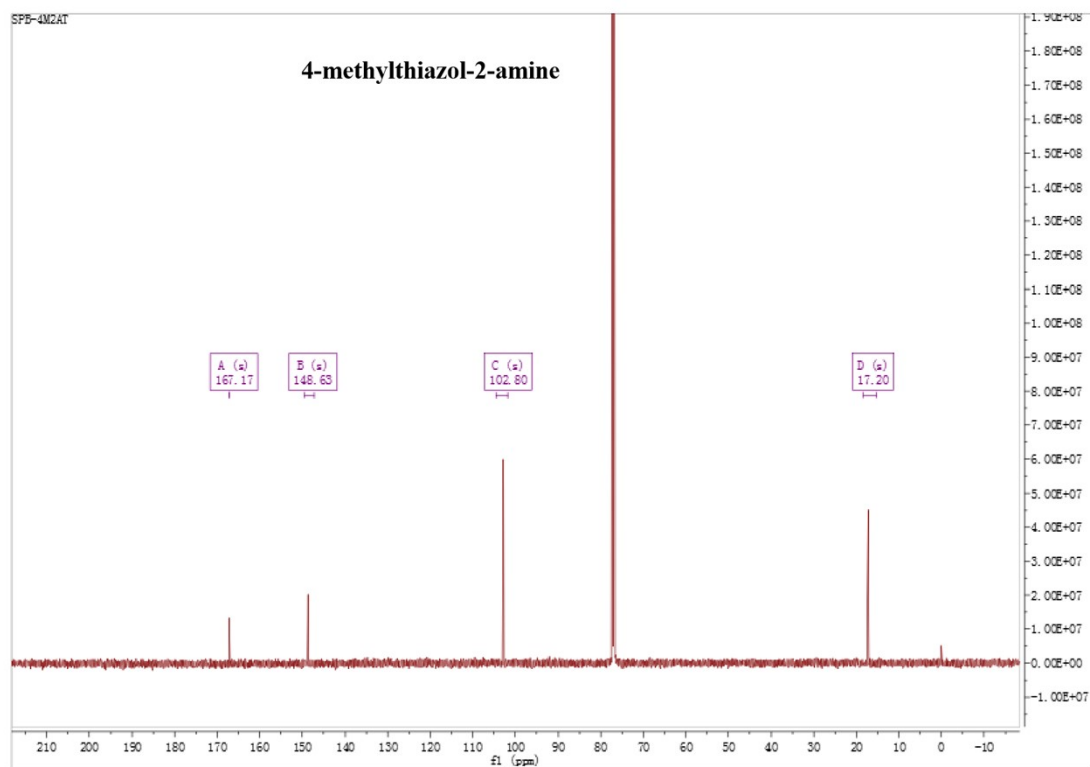


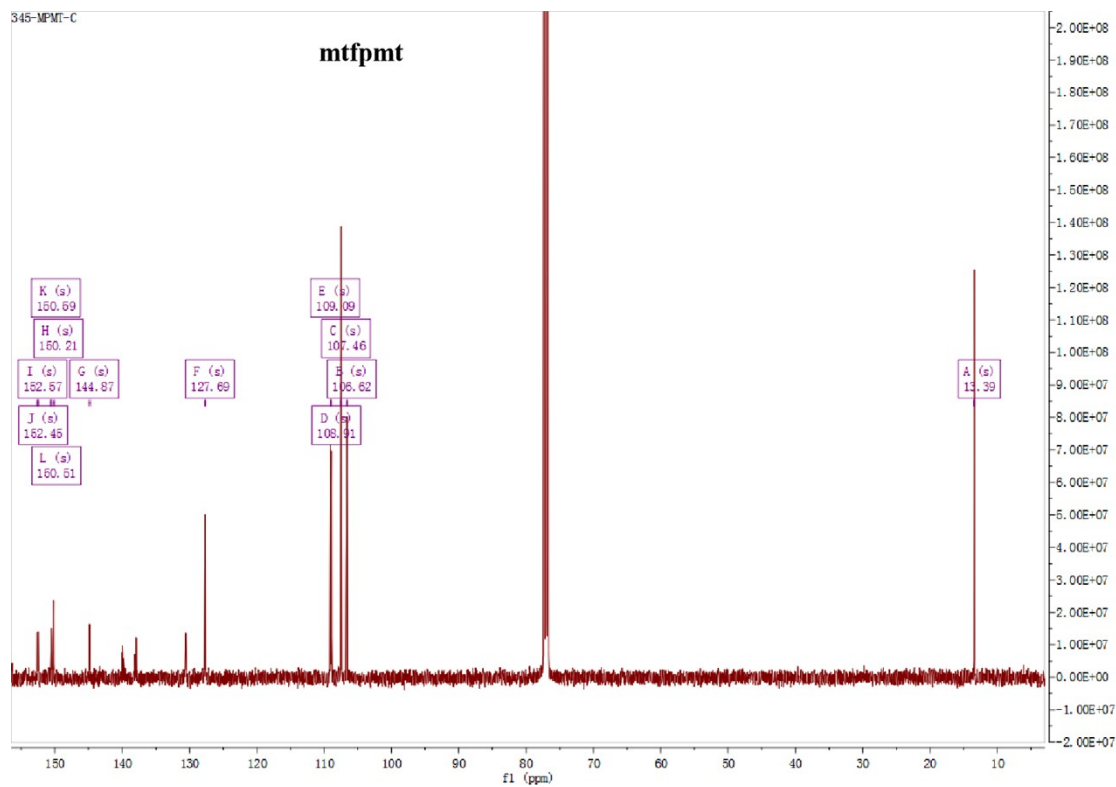
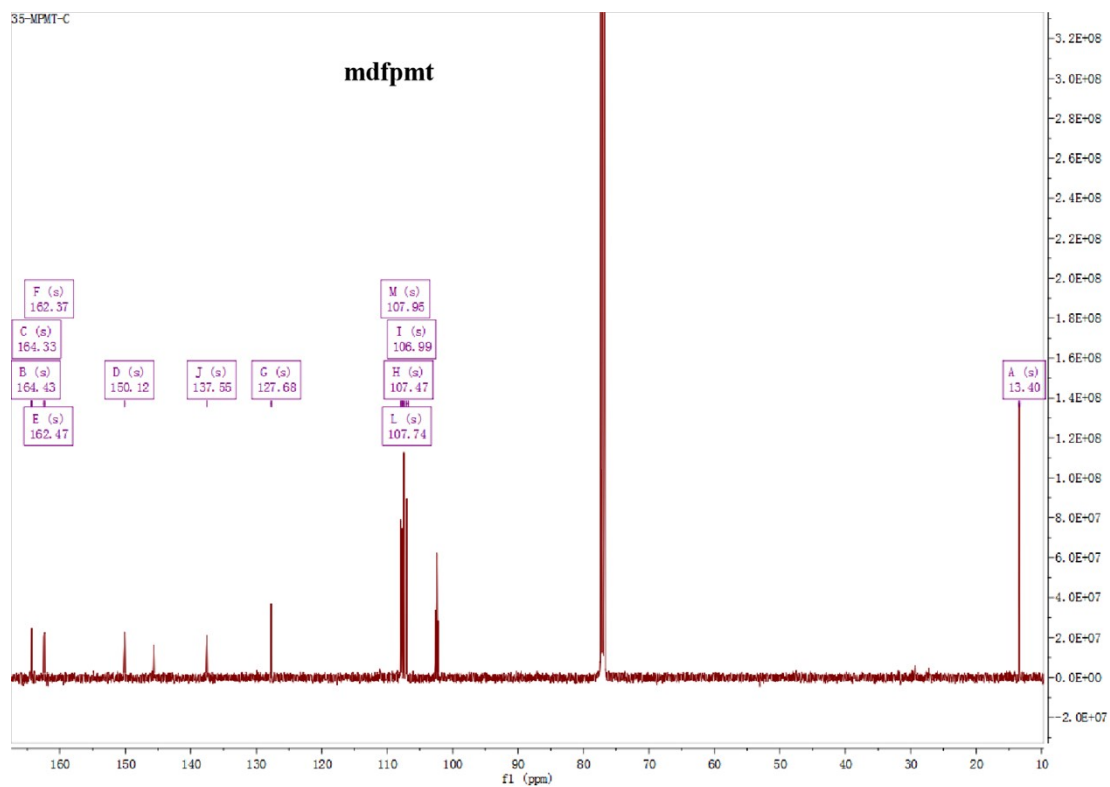


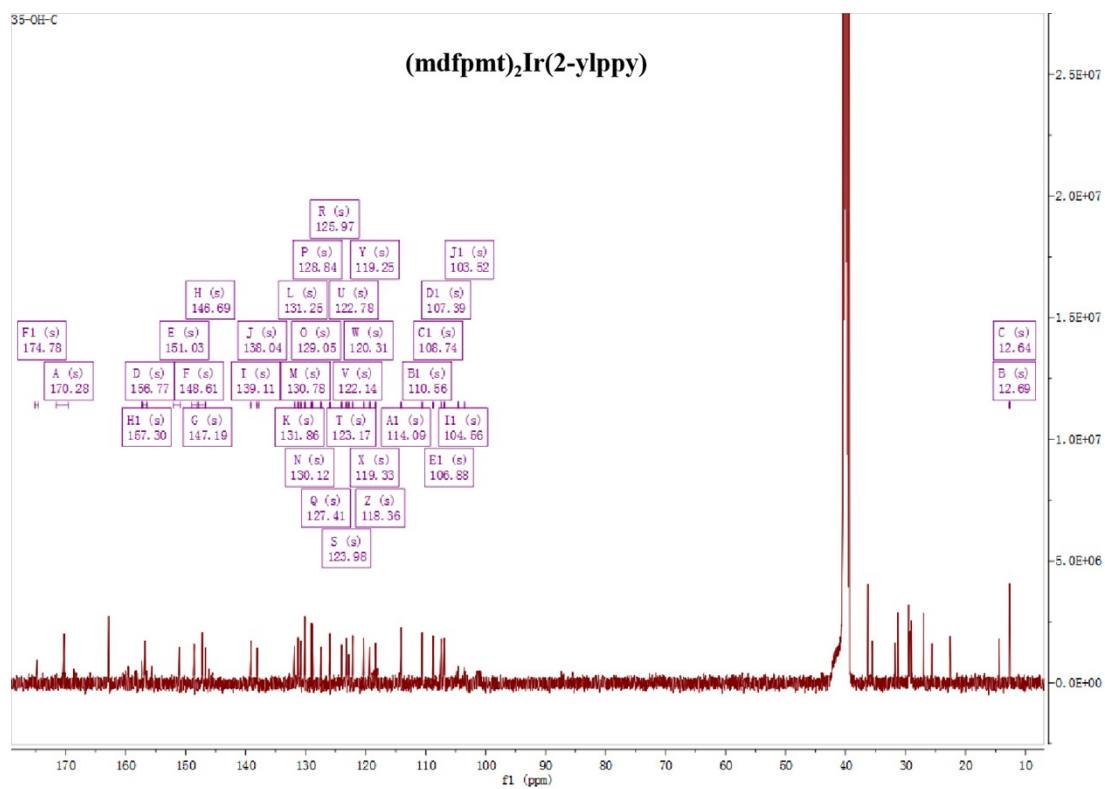
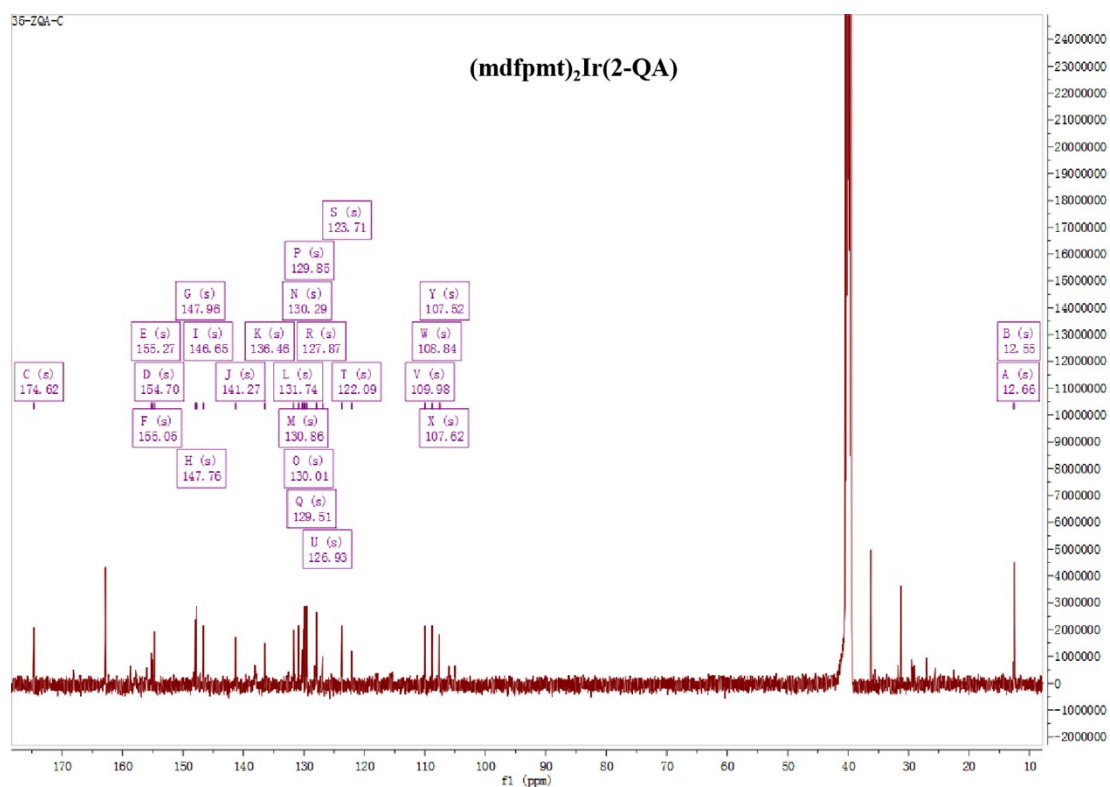


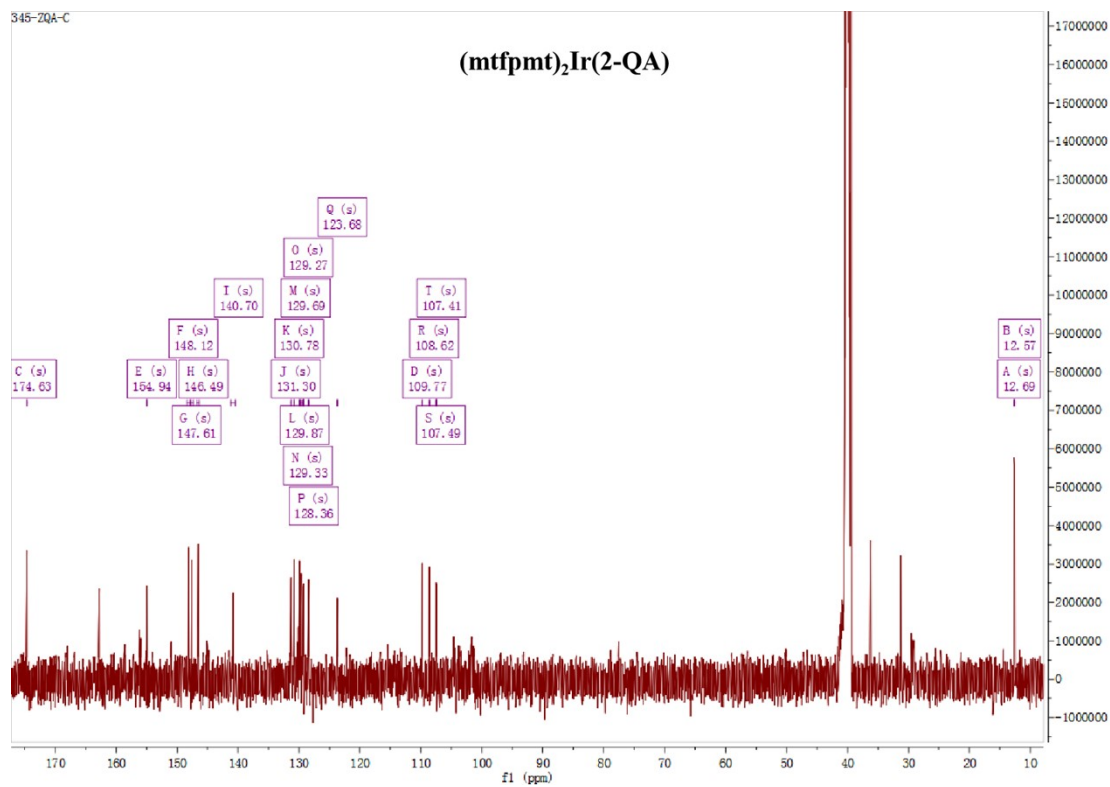
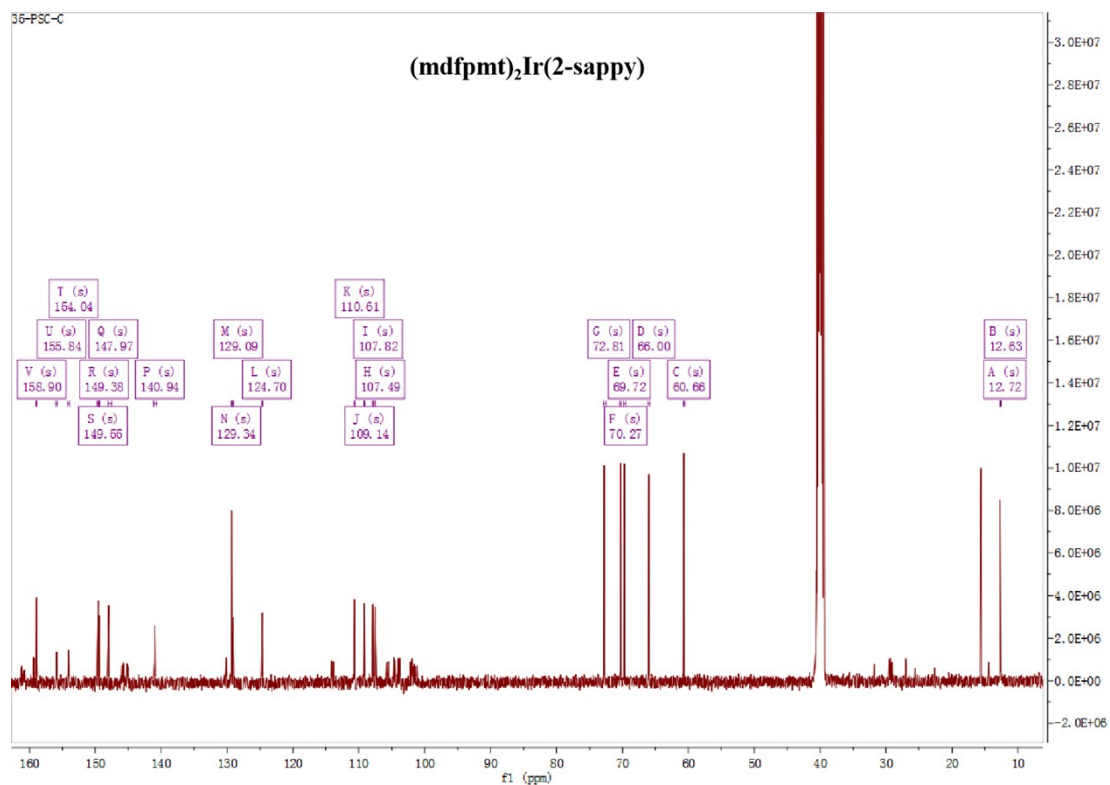


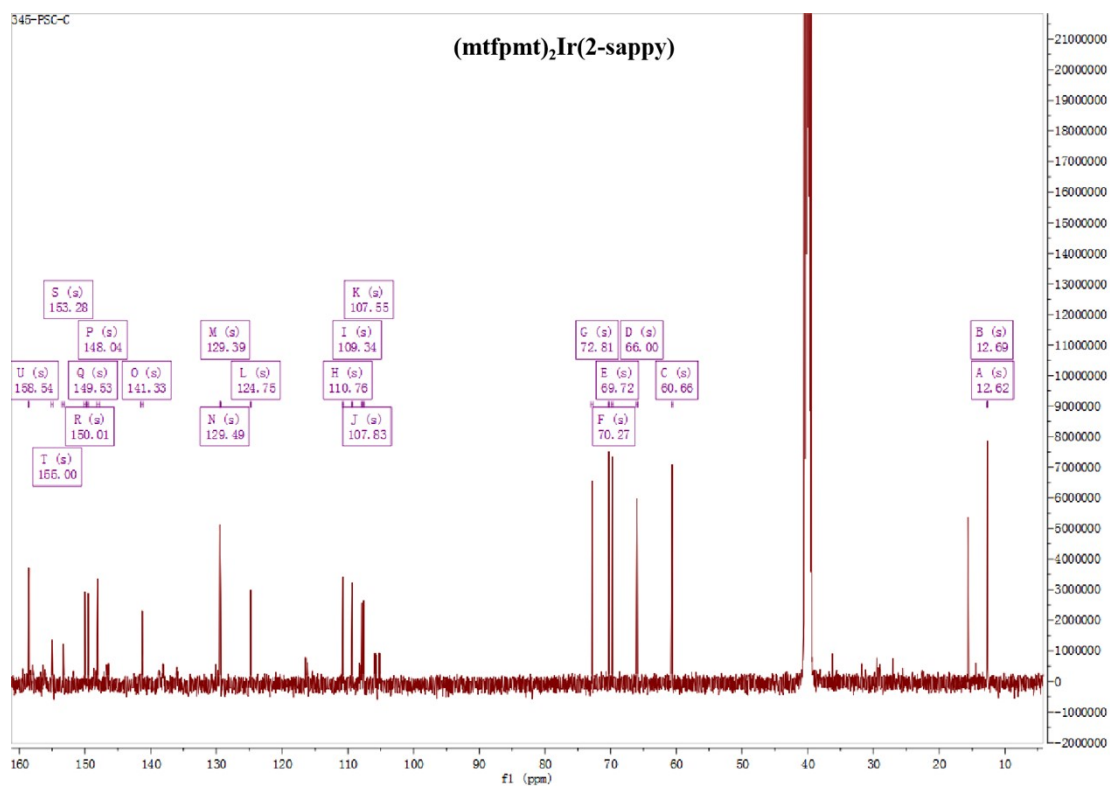
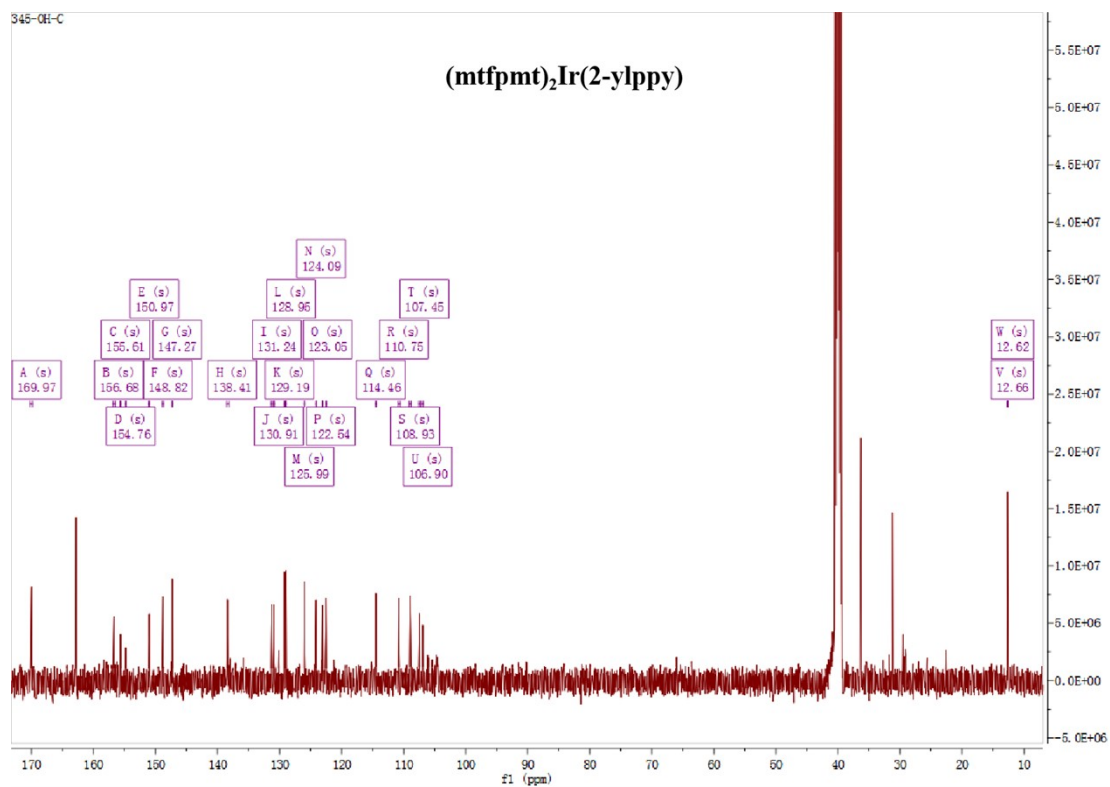
2 ¹³C NMR spectra for the Ir^{III} complexes and primary ligands:



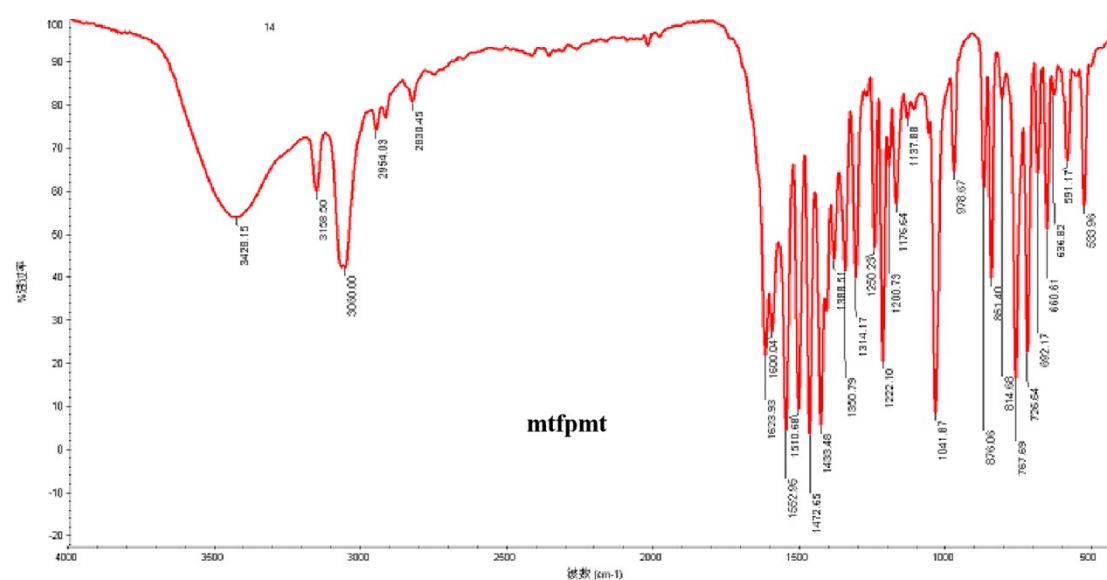
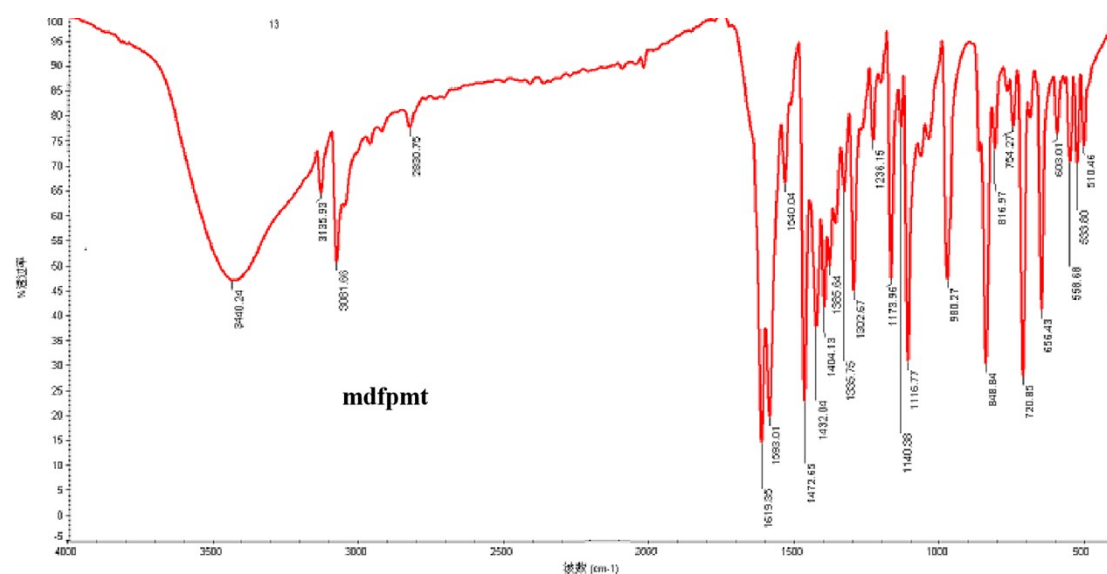


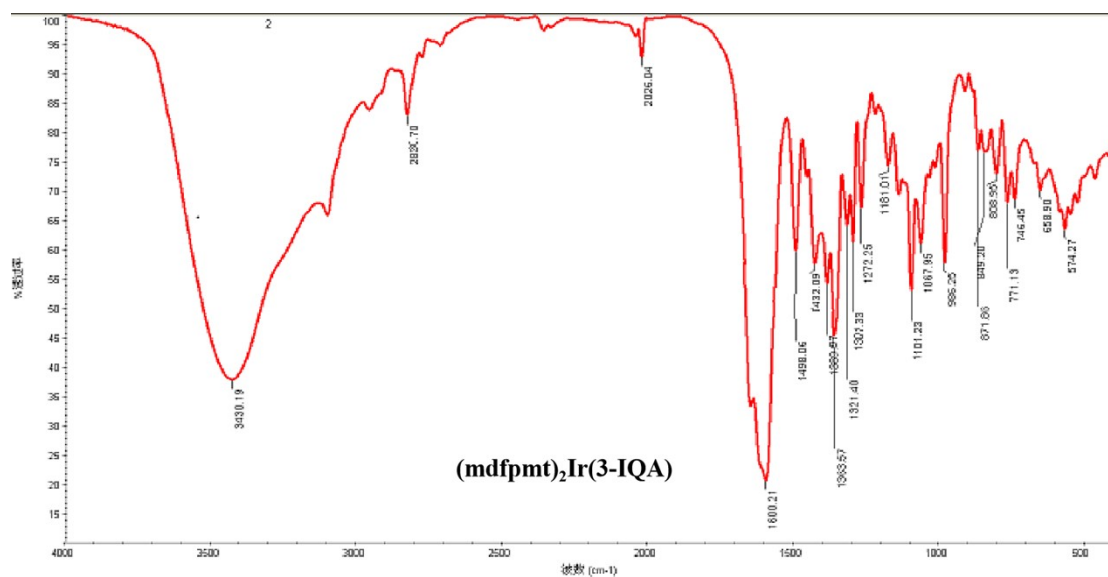
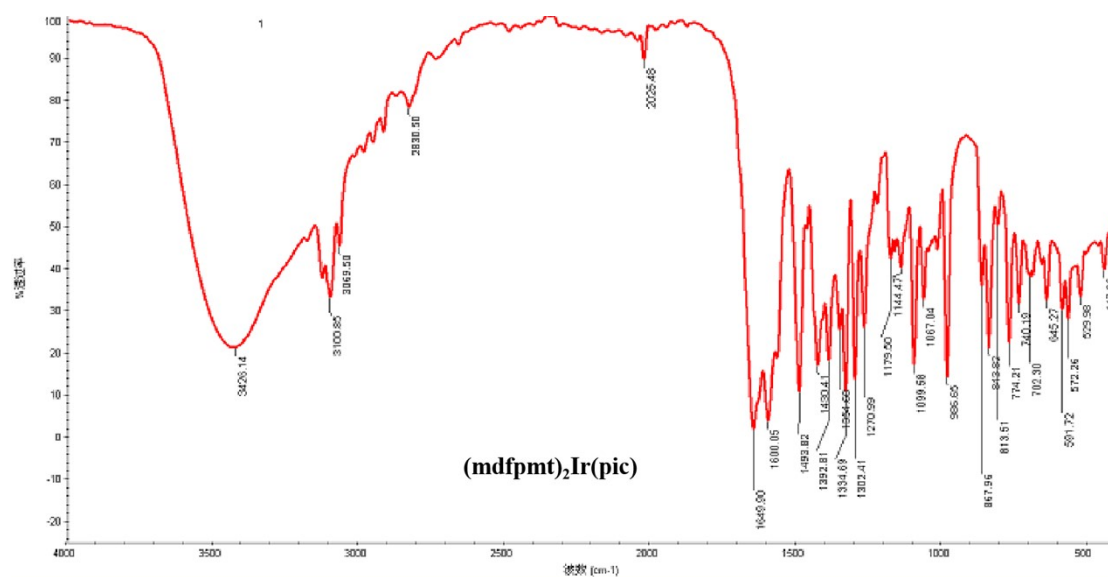


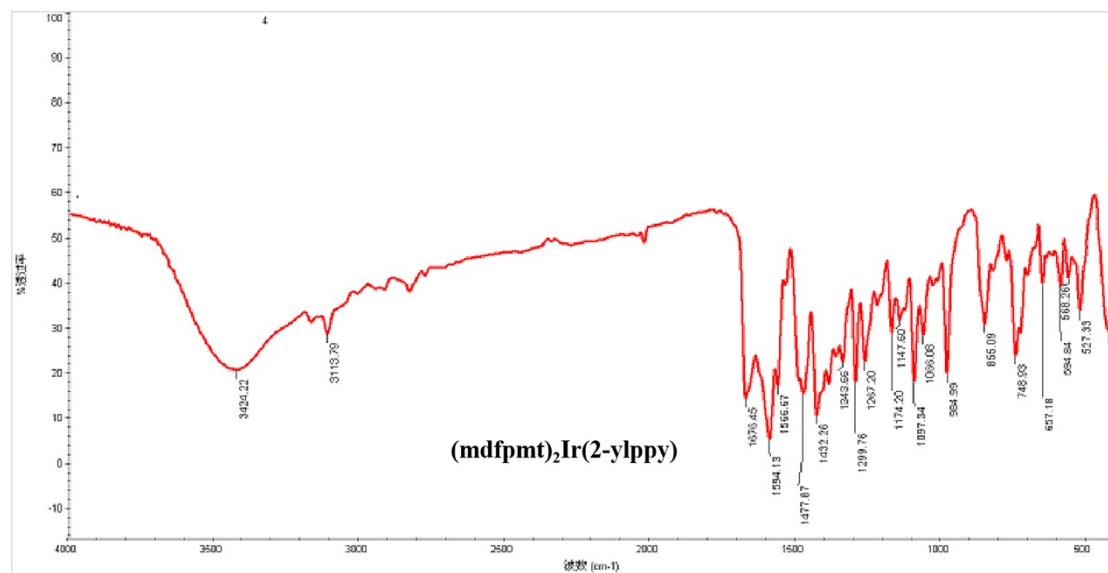
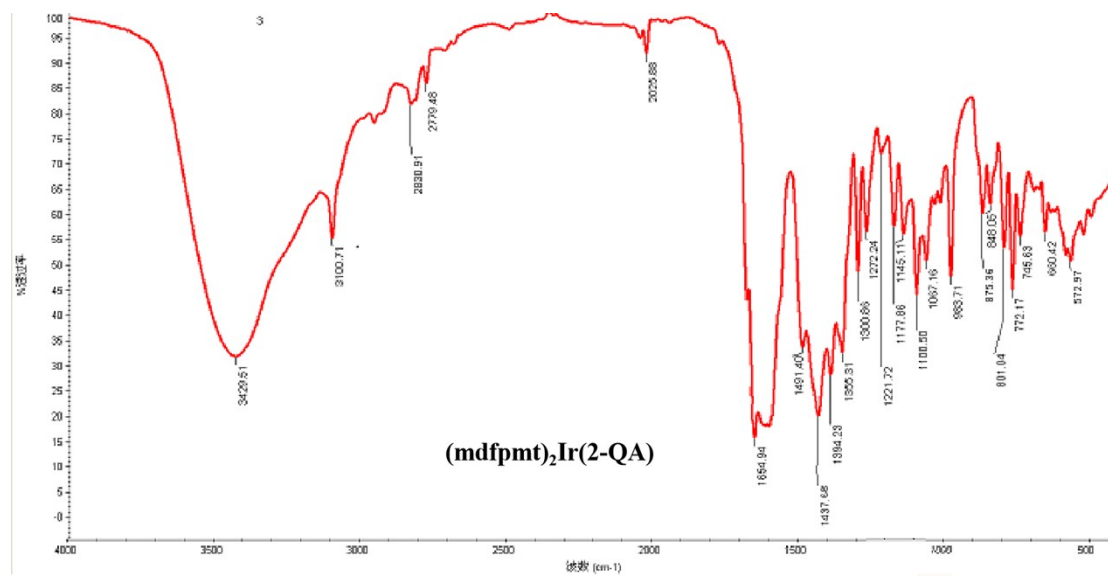


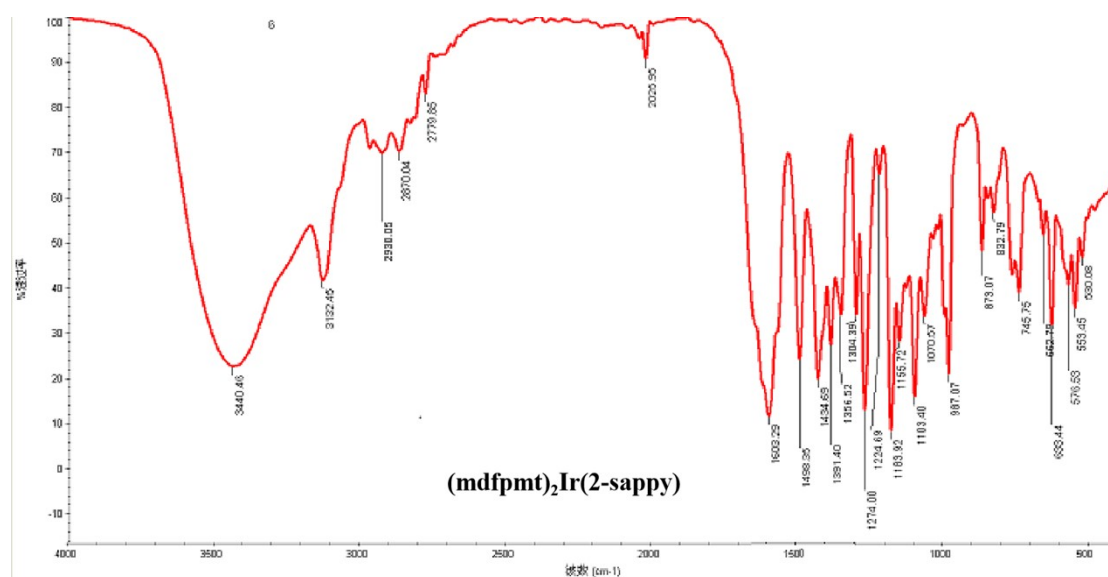
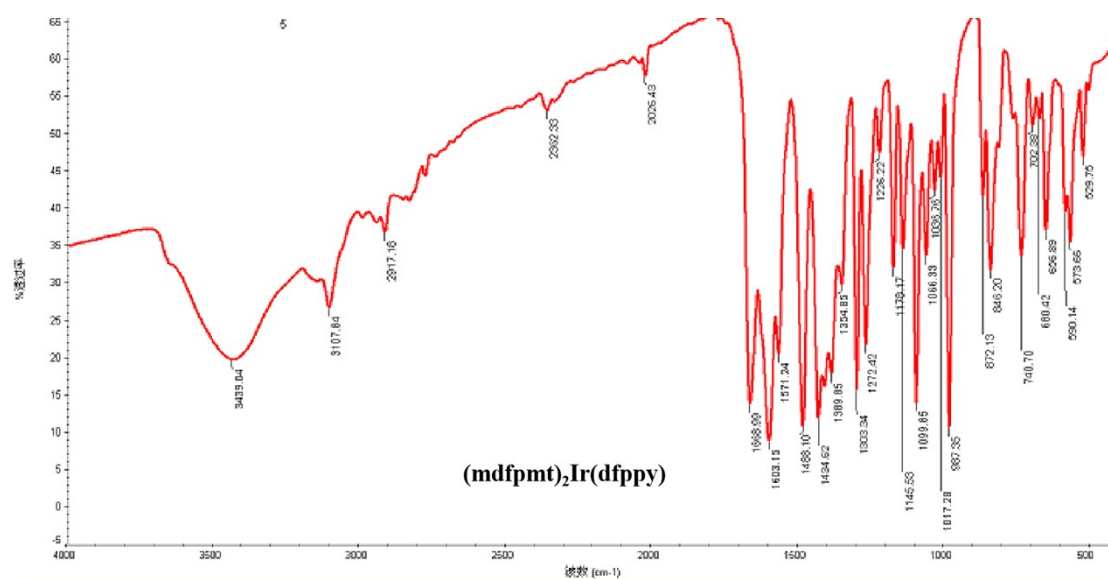


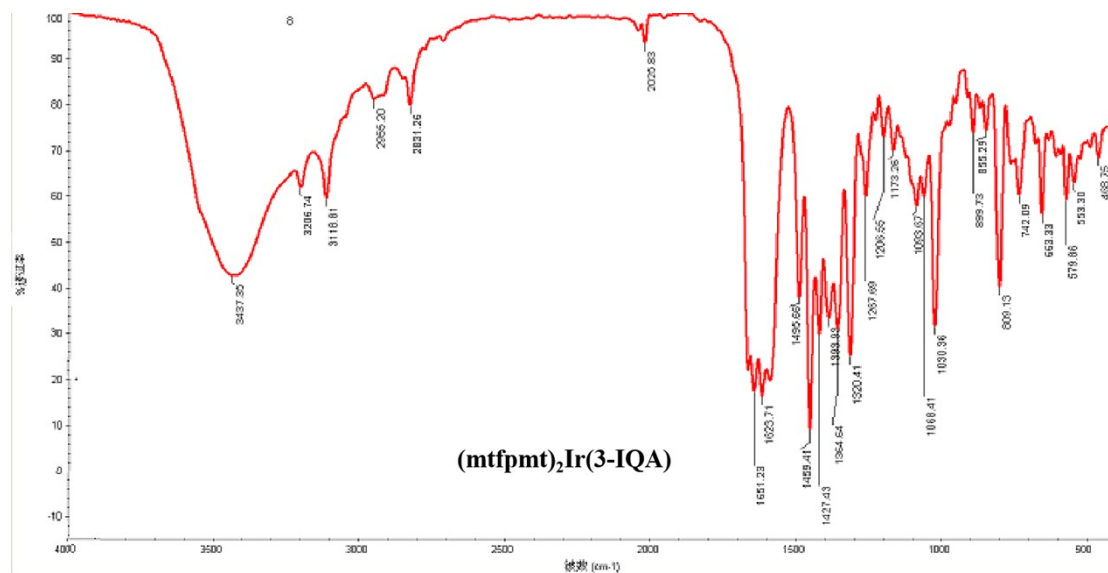
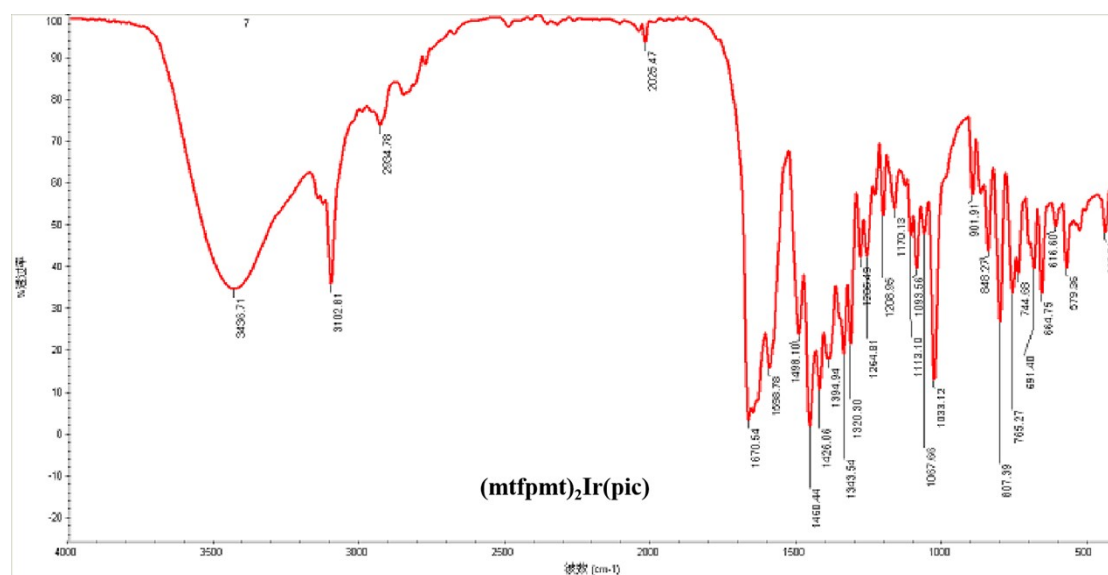
3 IR spectra for the Ir^{III} complexes and primary ligands:

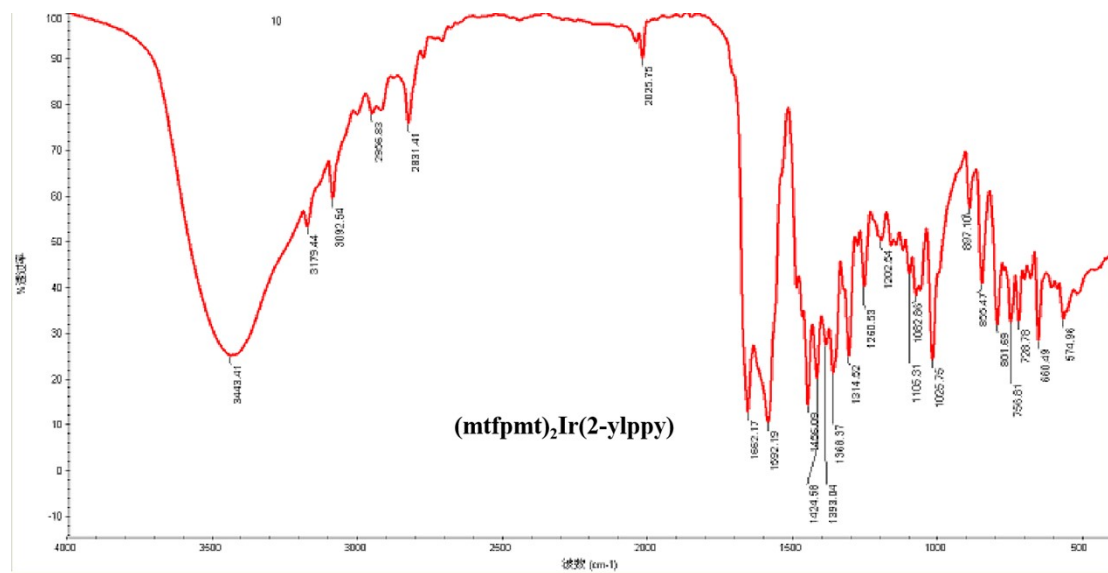
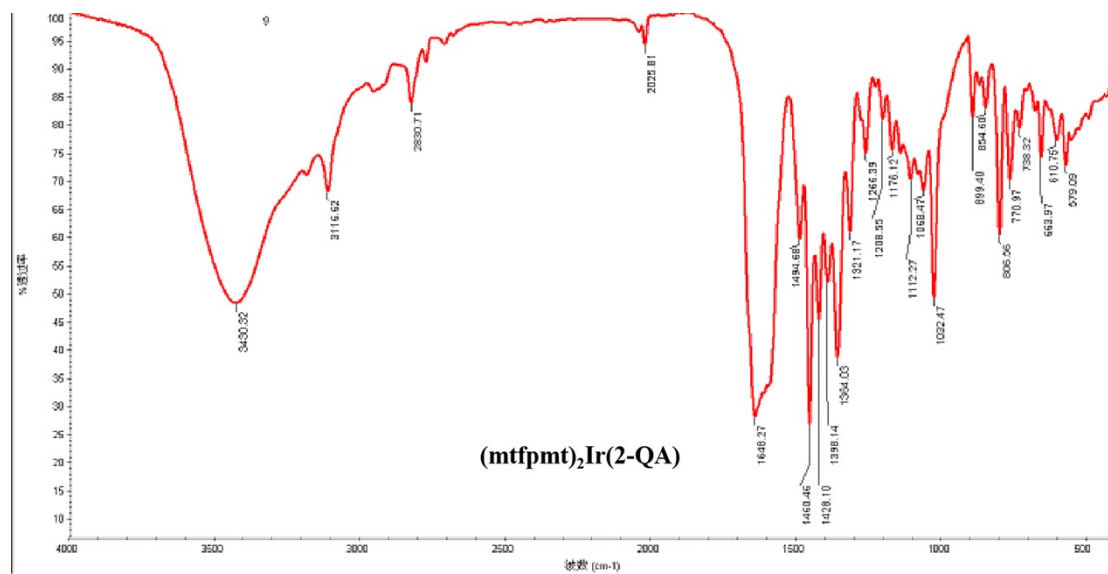


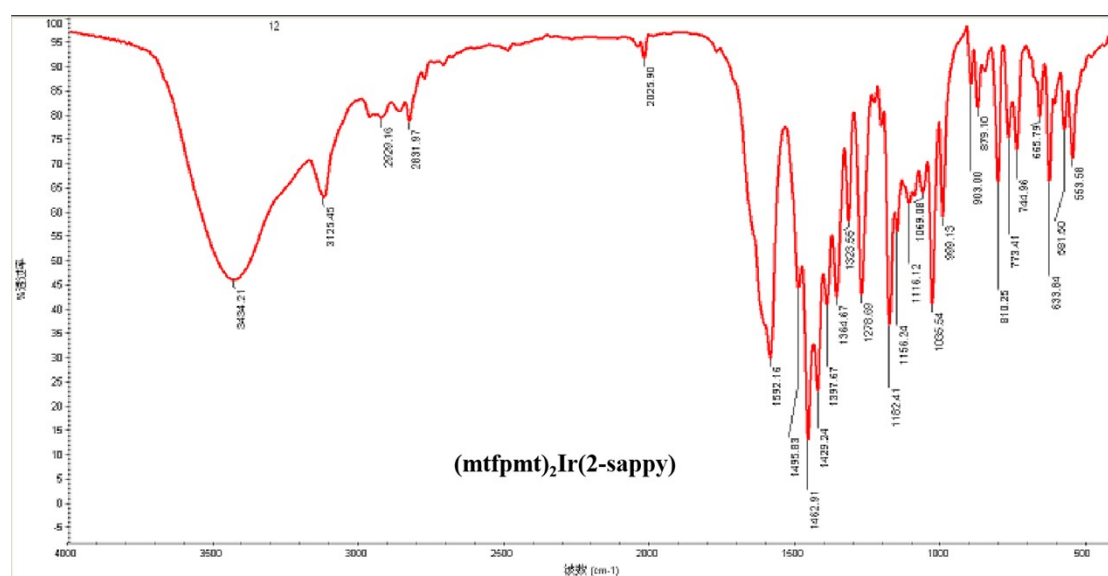
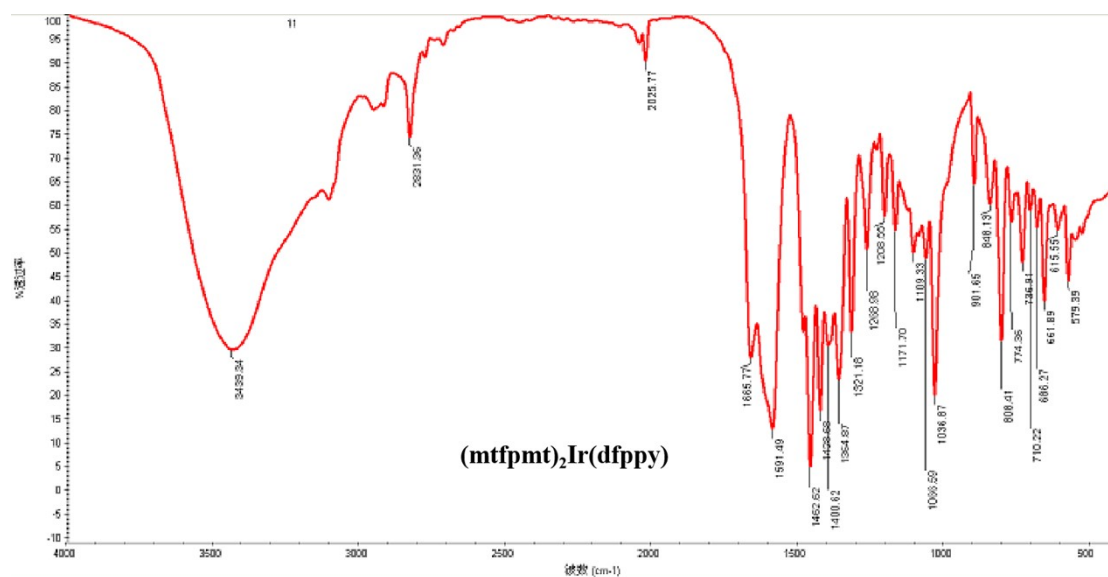




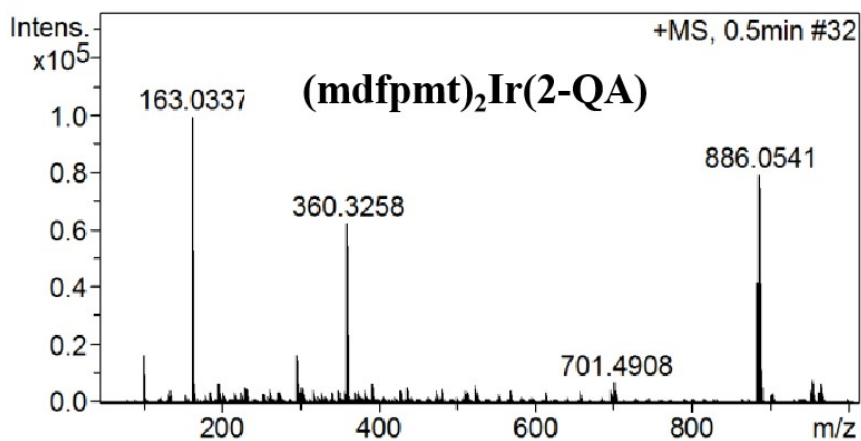
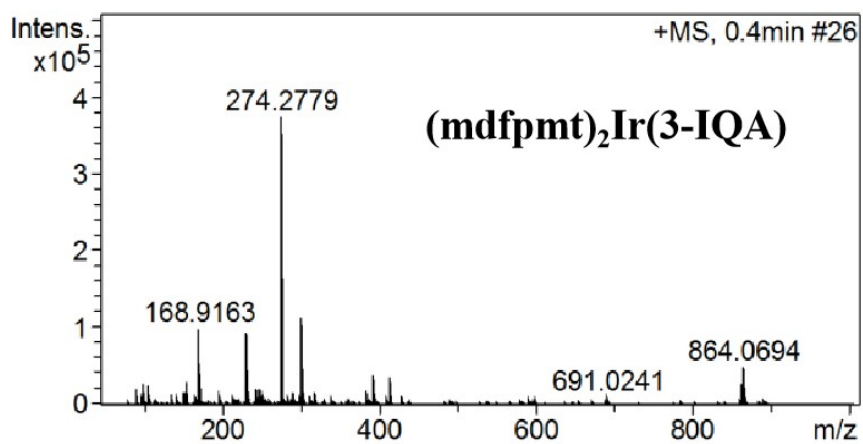
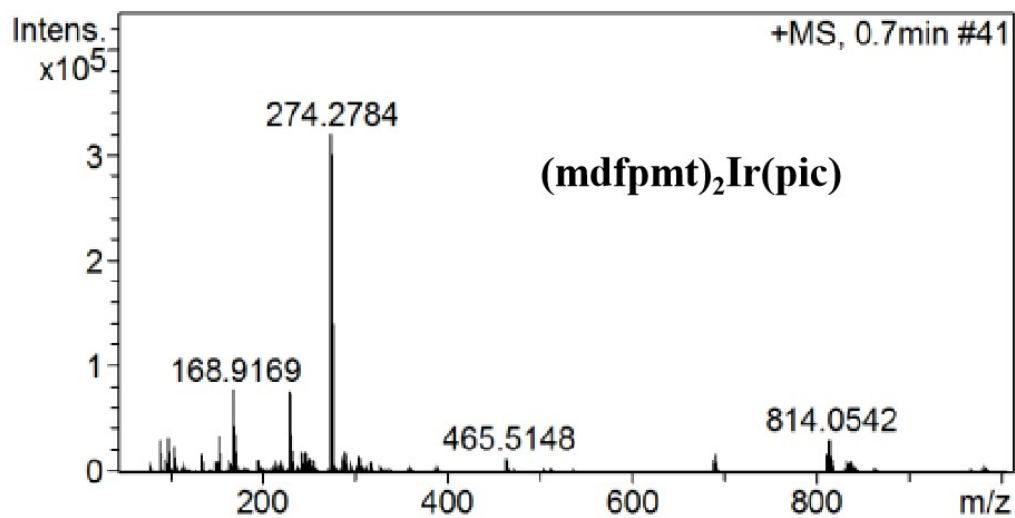


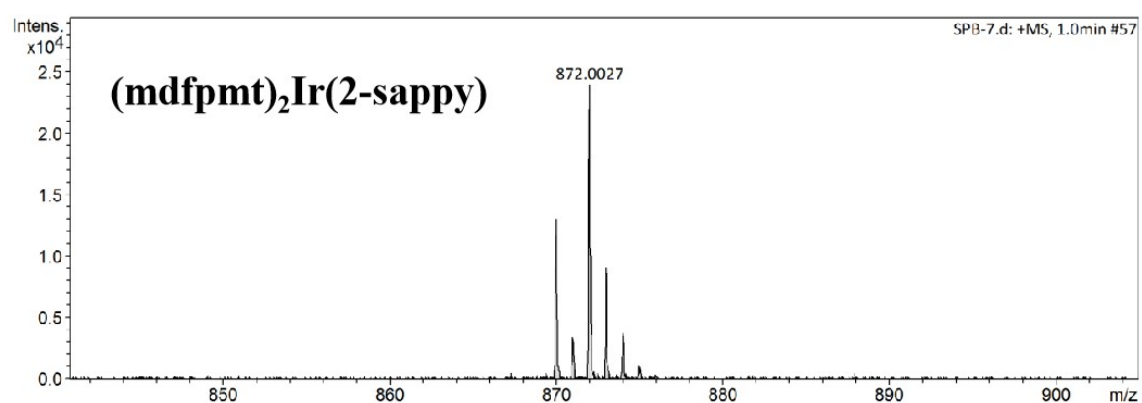
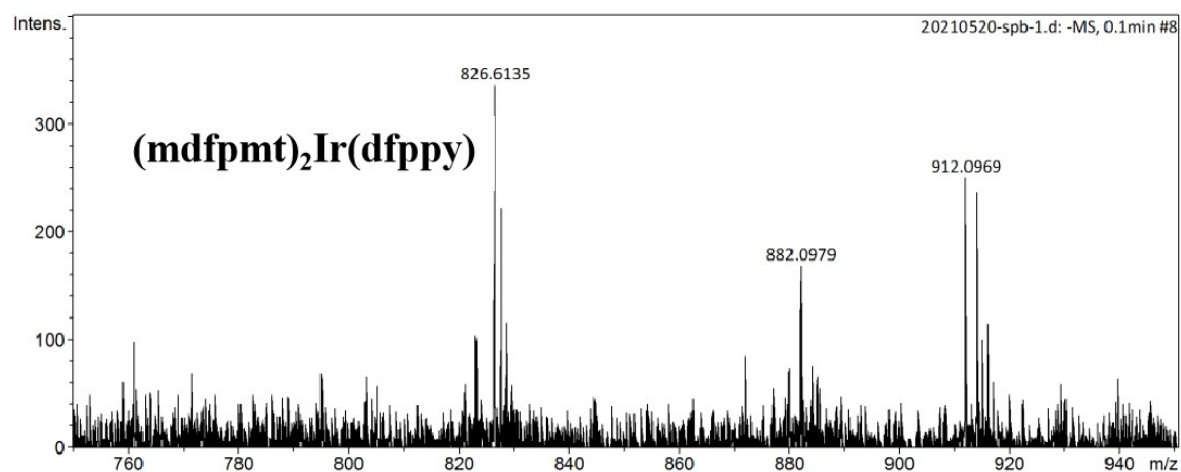
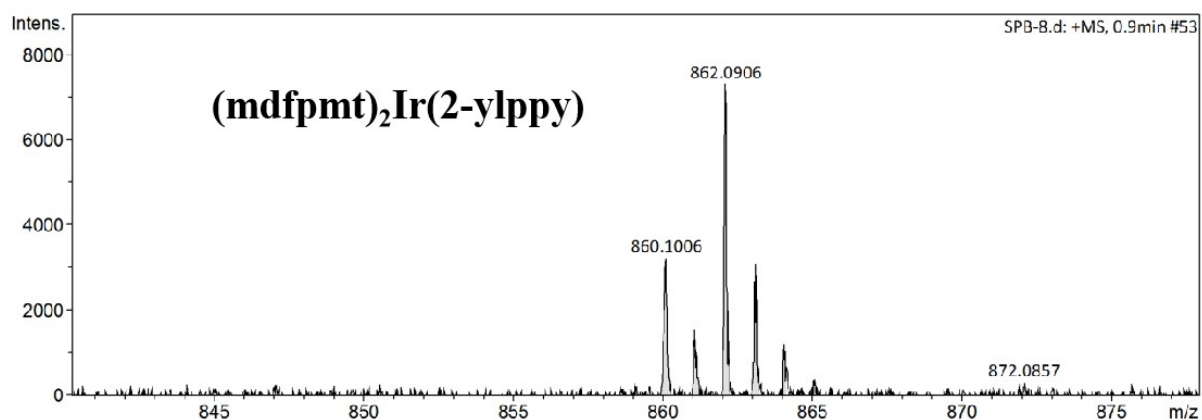


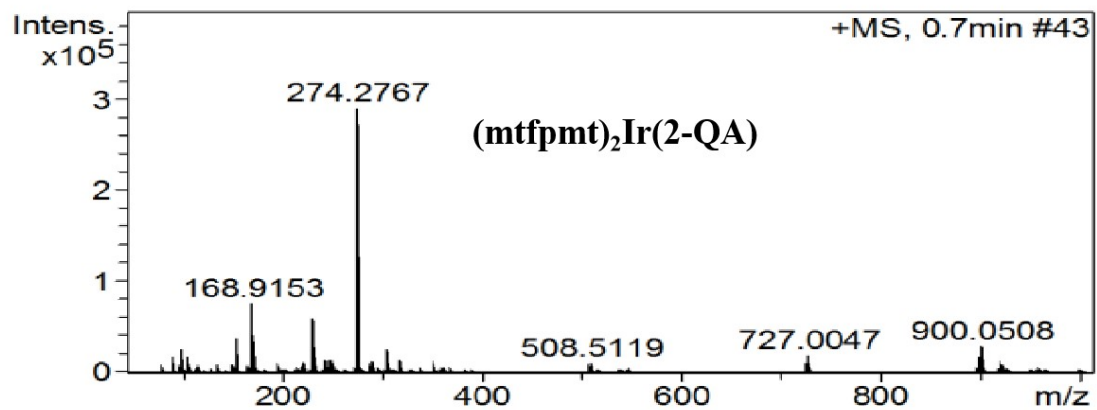
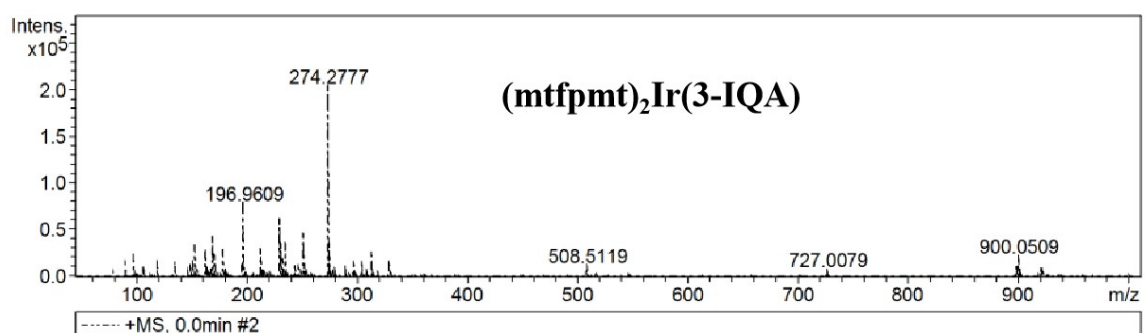
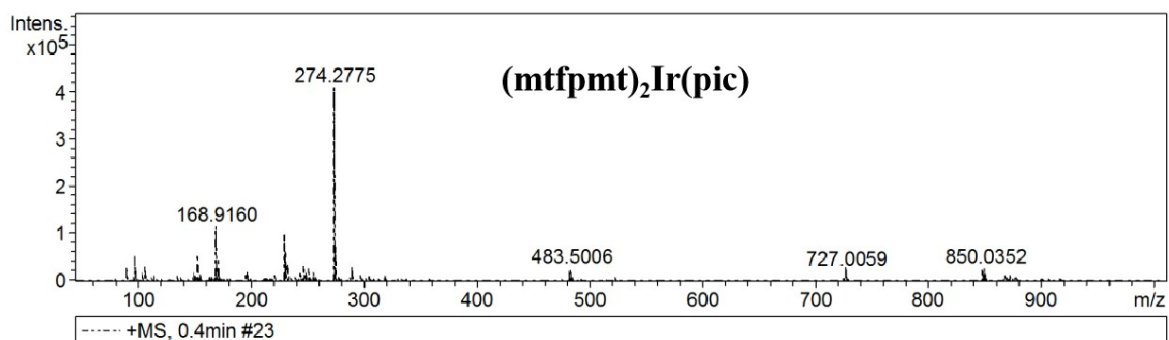


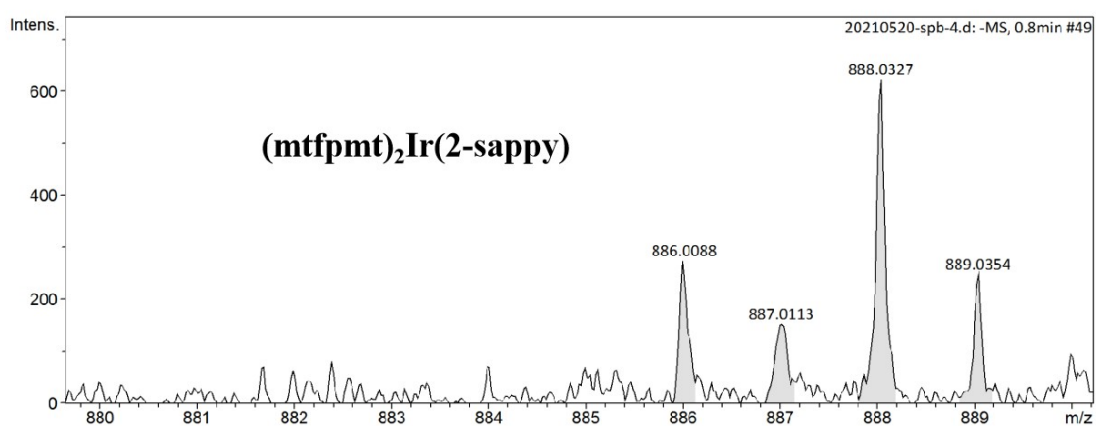
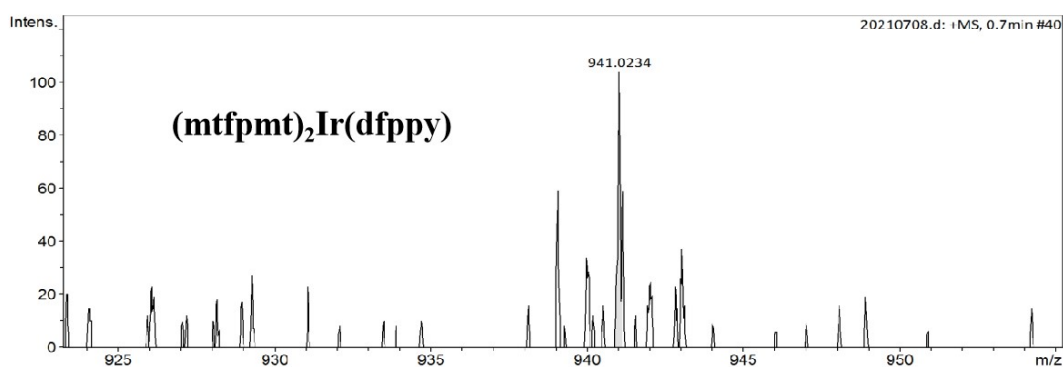
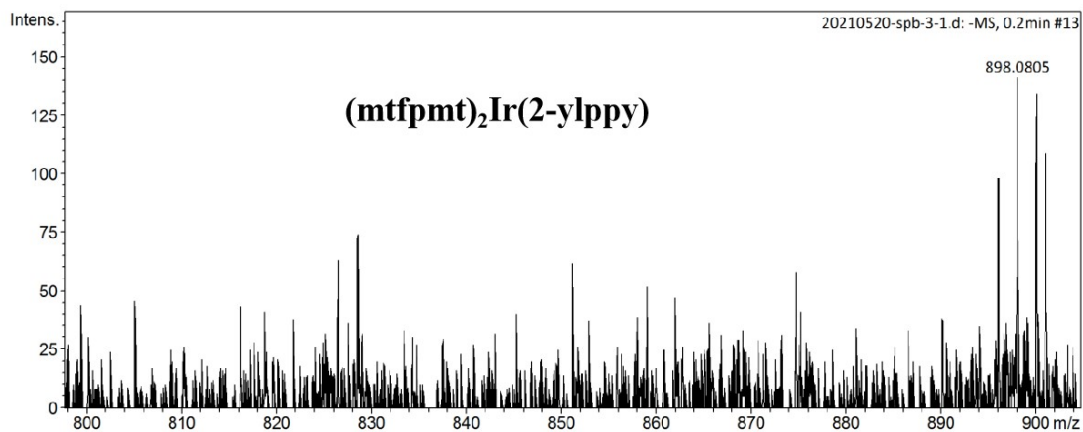


3 ESI-MS spectra for Ir^{III} complexes:

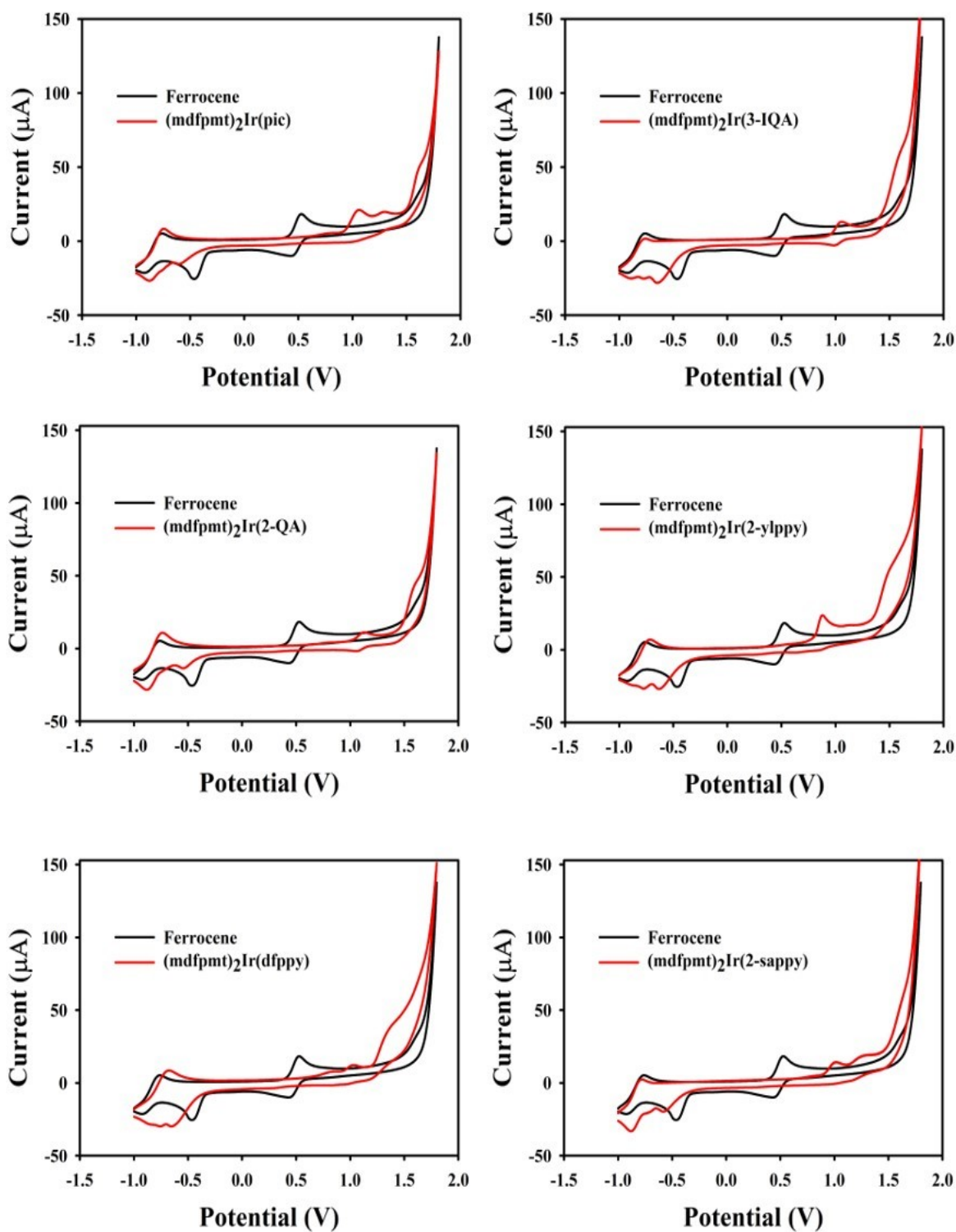


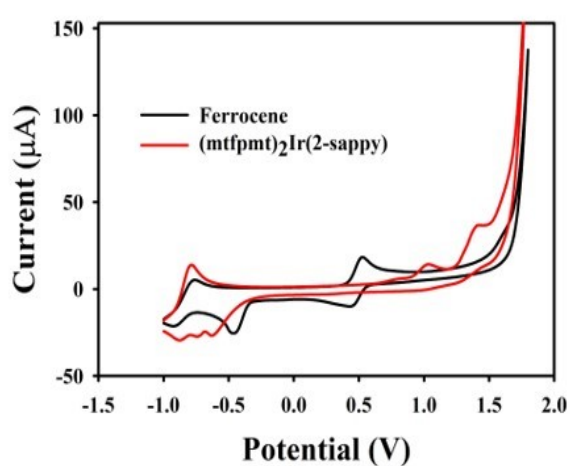
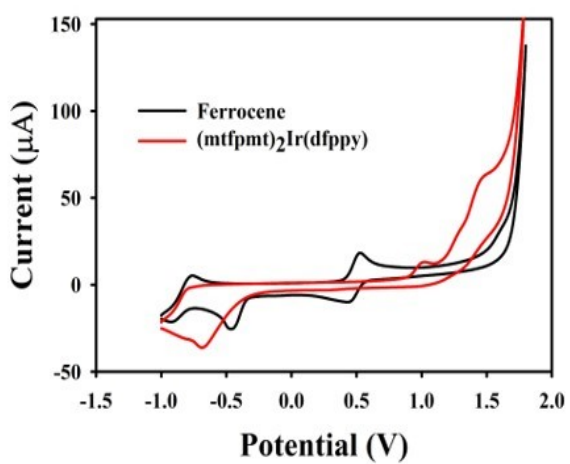
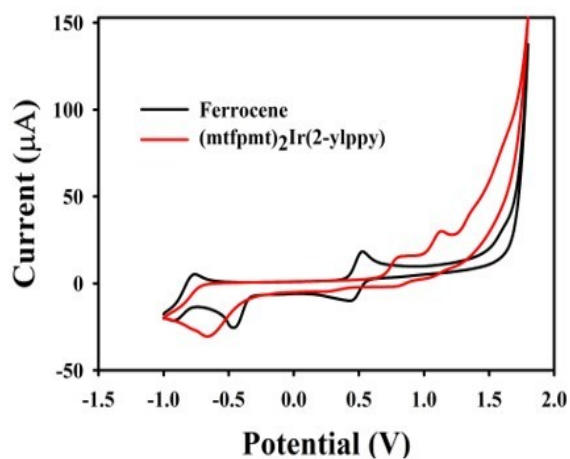
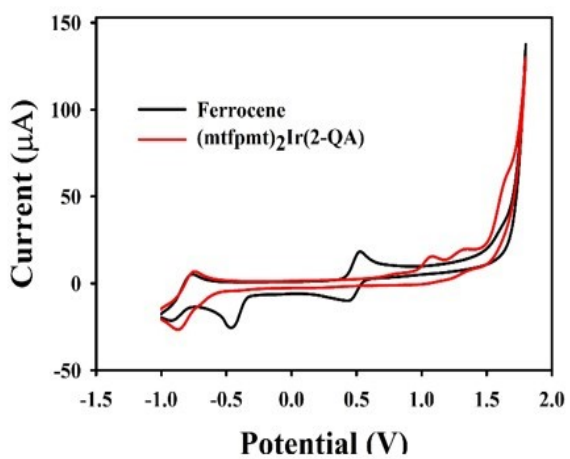
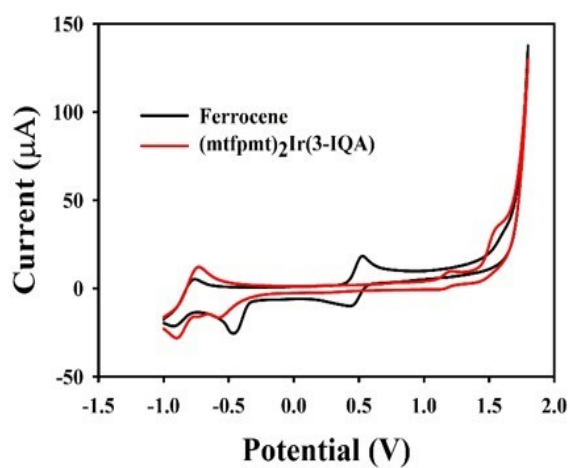
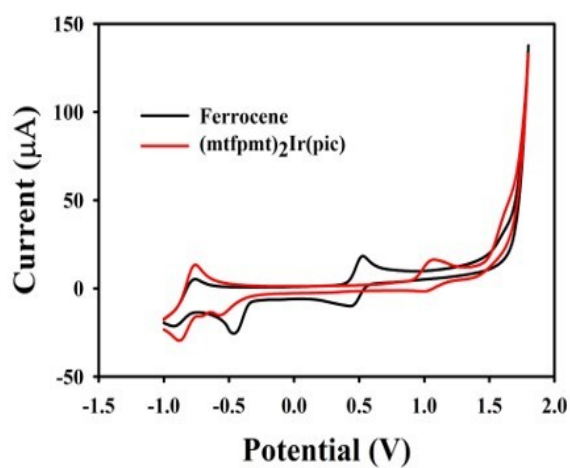






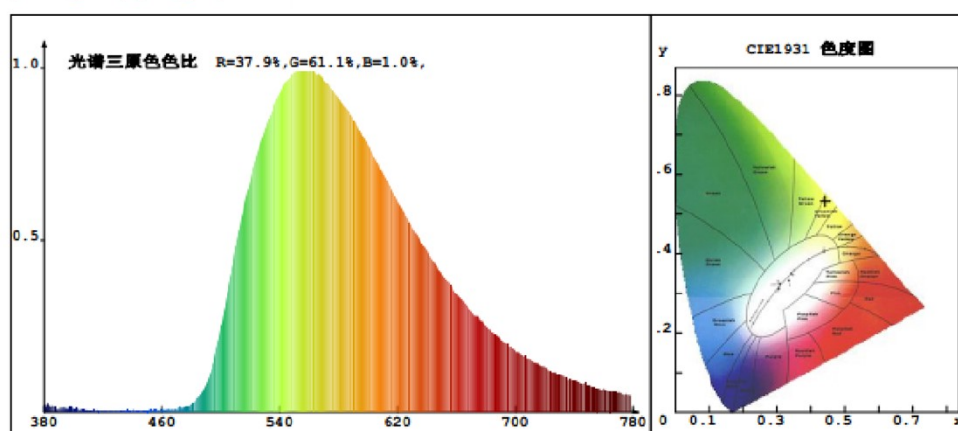
5 CV curves for the Ir^{III} complexes:





6 LED performances of Ir^{III} complexes

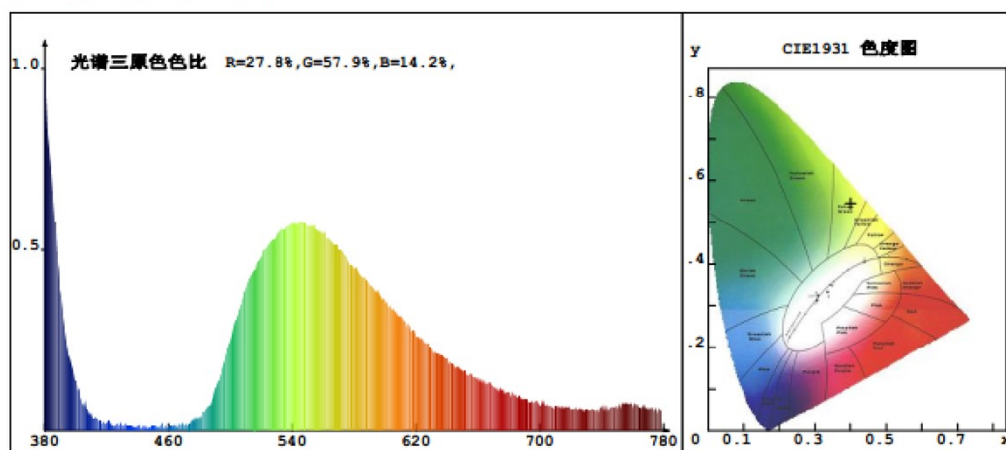
(mdfpmt)₂Ir(pic)



色度参数
CIE 色品坐标: $x=0.4427$ $y=0.5323$ $u=0.2083$ $v=0.3756$ $duv=0.0438$
 相关色温: 3705K 主波长: 571.0nm 色纯度: 92.8% excitation purity
 Dominant Wavelength
CRI 显色指数: $R_a = 44.6$
 $R_1 = 51$ $R_2 = 55$ $R_3 = 50$ $R_4 = 21$ $R_5 = 47$ $R_6 = 48$ $R_7 = 51$ $R_8 = 34$
 $R_9 = -69$ $R_{10} = 7$ $R_{11} = 0$ $R_{12} = 18$ $R_{13} = 50$ $R_{14} = 76$ $R_{15} = 38$

光度参数 **Efficiency**
 光通量: 2.5001lm 光效率: 7.41lm/W 光辐射功率: 6.1mW

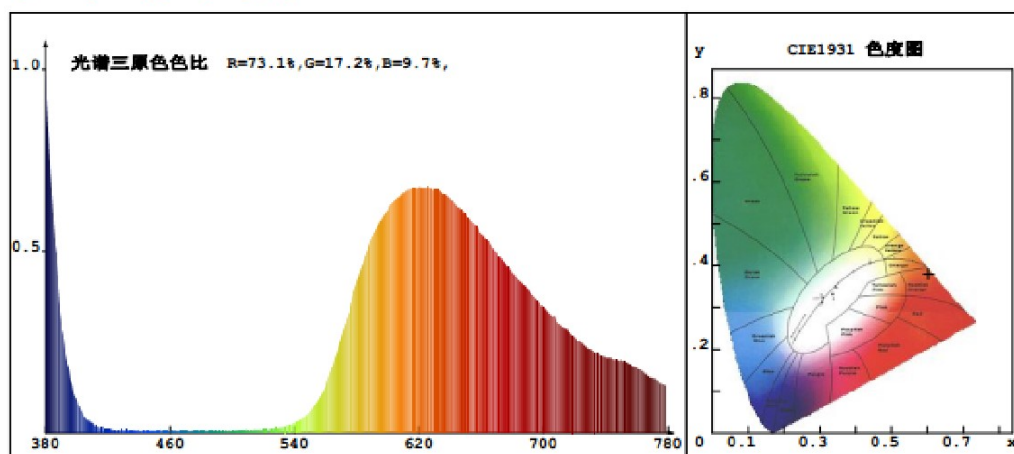
(mdfpmt)₂Ir(3-IQA)



色度参数
CIE 色品坐标: $x=0.4009$ $y=0.5458$ $u=0.1833$ $v=0.3744$ $duv=0.0570$
 相关色温: 4379K 主波长: 565.7nm 色纯度: 84.5% excitation purity
 Dominant Wavelength
CRI 显色指数: $R_a = 47.6$
 $R_1 = 45$ $R_2 = 56$ $R_3 = 61$ $R_4 = 28$ $R_5 = 45$ $R_6 = 50$ $R_7 = 63$ $R_8 = 32$
 $R_9 = -97$ $R_{10} = 13$ $R_{11} = 10$ $R_{12} = 25$ $R_{13} = 46$ $R_{14} = 82$ $R_{15} = 30$

光度参数 **Efficiency**
 光通量: 0.4801lm 光效率: 1.41lm/W 光辐射功率: 1.3mW

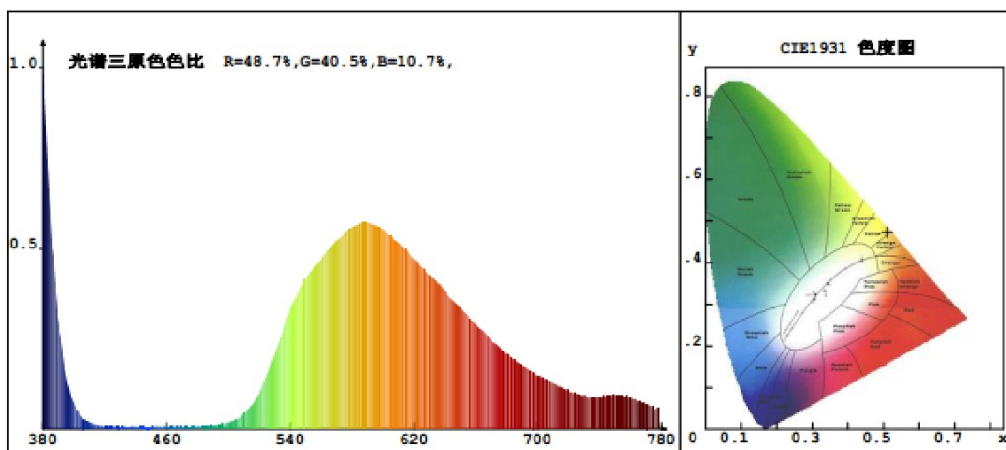
(mdfpmt)₂Ir(2-QA)



色度参数
CIE 色品坐标: $x=0.6031$ $y=0.3806$ $u=0.3792$ $v=0.3590$ $duv=-0.0005$
相关色温: 1354K 主波长: 597.7nm 色纯度: 95.3% excitation purity
CRI 显色指数: $R_a=54.8$
Dominant Wavelength
R1 =49 R2 =79 R3 =77 R4 =32 R5 =45 R6 =75 R7 =61 R8 =21
R9 =-39 R10=65 R11=15 R12=58 R13=52 R14=87 R15=46

光度参数
光通量: 0.820lm Efficiency
光效率: 2.4lm/W 光辐射功率: 4.9mW

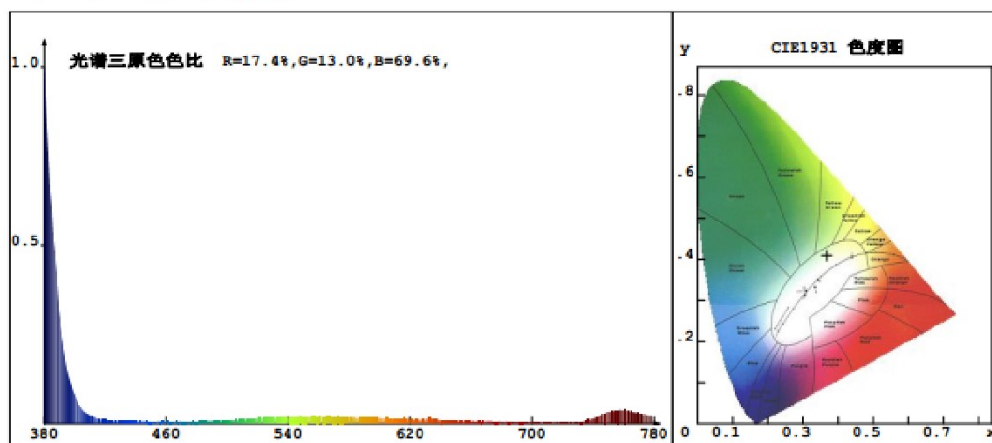
(mdfpmt)₂Ir(2-ylppy)



色度参数
CIE 色品坐标: $x=0.5107$ $y=0.4734$ $u=0.2667$ $v=0.3708$ $duv=0.0176$
相关色温: 2528K 主波长: 581.0nm 色纯度: 95.5% excitation purity
CRI 显色指数: $R_a=58.5$
Dominant Wavelength
R1 =52 R2 =68 R3 =82 R4 =50 R5 =46 R6 =49 R7 =84 R8 =38
R9 =-52 R10=25 R11=28 R12=3 R13=53 R14=89 R15=47

光度参数
光通量: 1.530lm Efficiency
光效率: 4.5lm/W 光辐射功率: 4.9mW

(mdfpmt)₂Ir(dfppy)

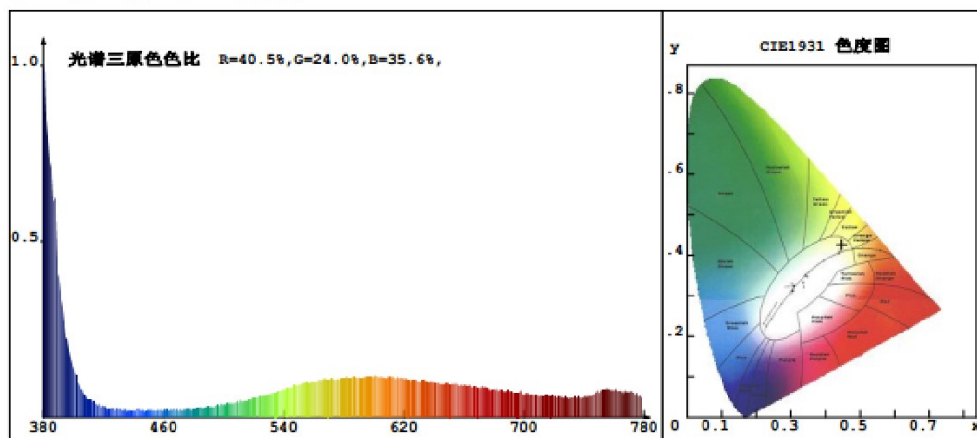


色度参数
 CIE 色品坐标: $x=0.3682$ $y=0.4100$ $u=0.2050$ $v=0.3424$ $duv=0.0186$
 相关色温: 4521K 主波长: 569.0nm 色纯度: 33.6% excitation purity
 Dominant Wavelength
 CRI 显色指数: $R_a = 72.3$

R1 =65	R2 =74	R3 =86	R4 =72	R5 =67	R6 =69	R7 =84	R8 =61
R9 =-24	R10=42	R11=66	R12=51	R13=63	R14=91	R15=59	

光度参数
 光通量: 0.110lm Efficiency
 光效率: 0.3lm/W 光辐射功率: 1.3mW

(mdfpmt)₂Ir(2-sappy)

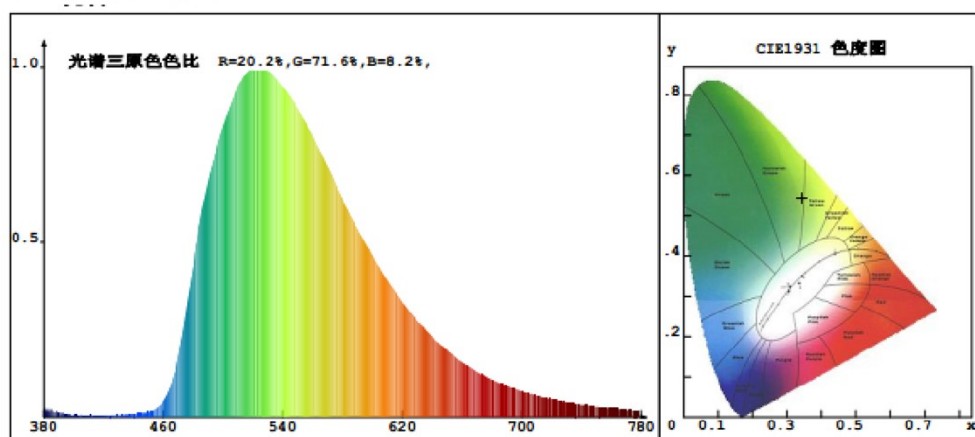


色度参数
 CIE 色品坐标: $x=0.4472$ $y=0.4259$ $u=0.2478$ $v=0.3541$ $duv=0.0071$
 相关色温: 3005K 主波长: 580.6nm 色纯度: 62.1% excitation purity
 Dominant Wavelength
 CRI 显色指数: $R_a = 80.3$

R1 =77	R2 =84	R3 =91	R4 =79	R5 =75	R6 =78	R7 =90	R8 =69
R9 =21	R10=63	R11=72	R12=61	R13=77	R14=95	R15=73	

光度参数
 光通量: 0.170lm Efficiency
 光效率: 0.5lm/W 光辐射功率: 1.0mW

(mtfpmt)₂Ir(pic)



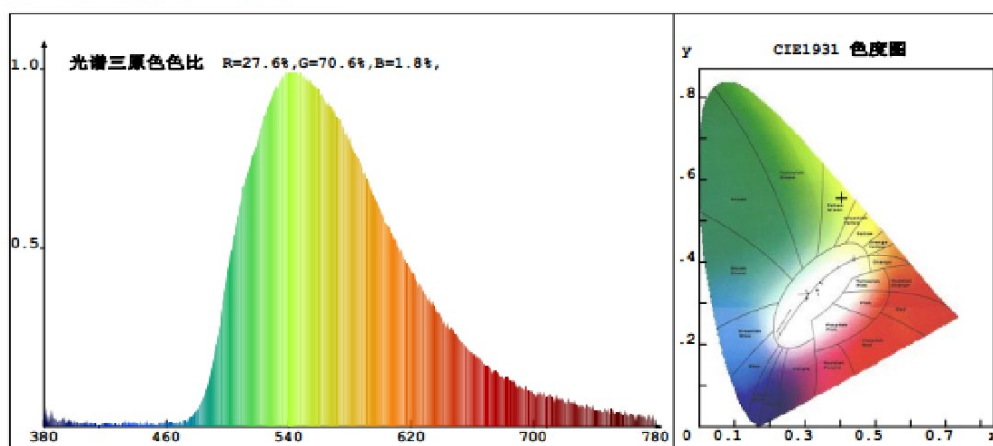
色度参数
 CIE 色品坐标: $x=0.3425$ $y=0.5449$ $u=0.1547$ $v=0.3693$ $duv=0.0728$
 相关色温: 5367K 主波长: 556.3nm 色纯度: 66.8% excitation purity
 Dominant Wavelength

CRI 显色指数: $R_a = 41.7$

R1 =40	R2 =57	R3 =58	R4 =12	R5 =42	R6 =57	R7 =47	R8 =21
R9 =-123	R10=23	R11=3	R12=38	R13=42	R14=79	R15=23	

光度参数 Efficiency
 光通量: 5.980lm 光效率: 17.1lm/W 光辐射功率: 14.5mW

(mtfpmt)₂Ir(3-IQA)



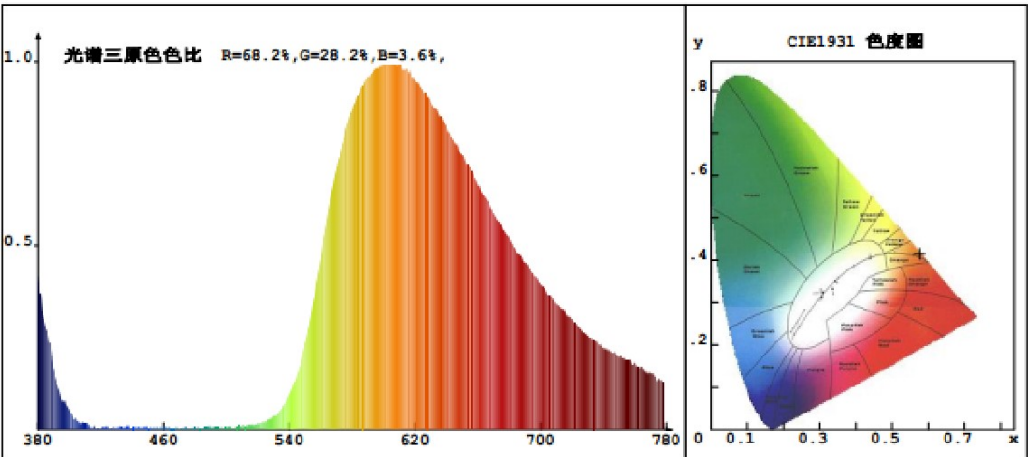
色度参数
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 相关色温: 4360K 主波长: 565.6nm 色纯度: 88.4% excitation purity
 Dominant Wavelength

CRI 显色指数: $R_a = 36.8$

R1 =41	R2 =49	R3 =45	R4 =8	R5 =40	R6 =47	R7 =43	R8 =22
R9 =-112	R10=1	R11=-13	R12=22	R13=41	R14=74	R15=25	

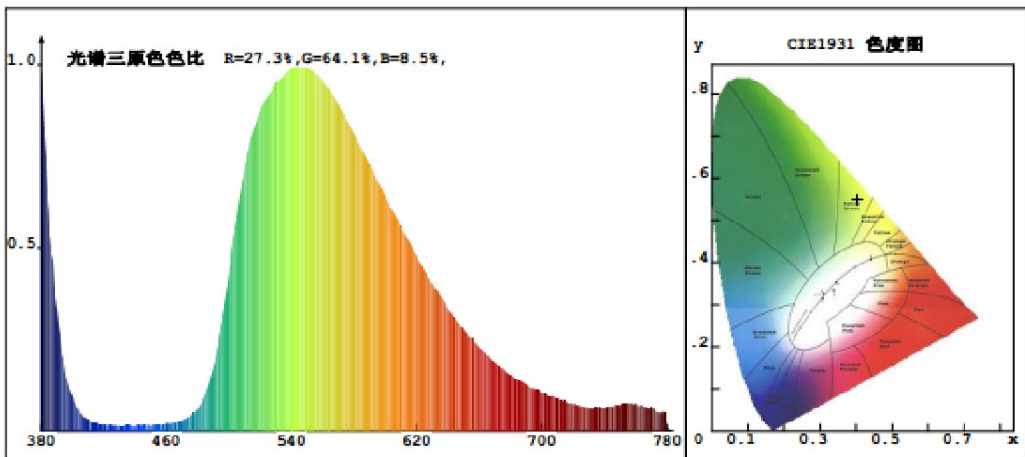
光度参数 Efficiency
 光通量: 0.880lm 光效率: 2.5lm/W 光辐射功率: 2.0mW

(mtfpmt)₂Ir(2-QA)



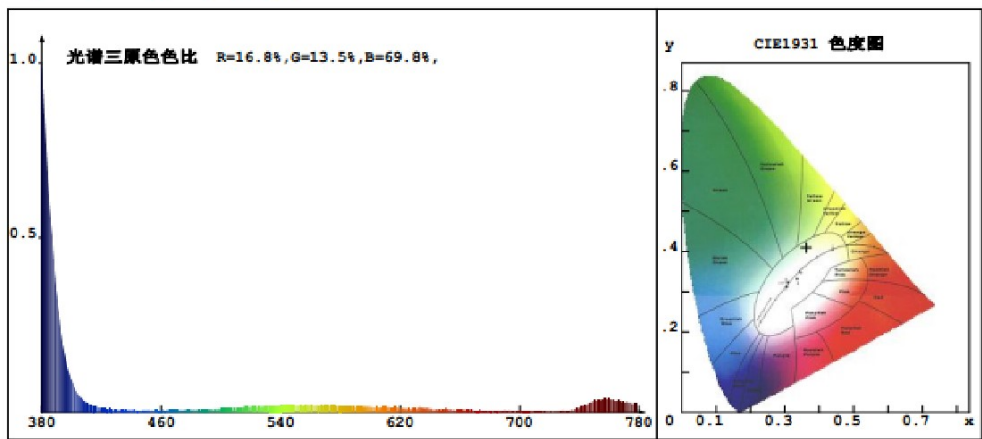
色度参数
CIE 色品坐标: x=0.5435 y=0.4163 u=0.3147 v=0.3615 duv=0.0018
相关色温: 1887K 主波长: 589.4nm 色纯度: 97.8% excitation purity
CRI 显色指数: Ra= 46.9
R1 =38 R2 =69 R3 =87 R4 =21 R5 =30 R6 =53 R7 =64 R8 =13
R9 =-63 R10=42 R11=-8 R12=11 R13=39 R14=92 R15=38
光度参数 Efficiency
光通量: 1.1501lm 光效率: 3.41lm/W 光辐射功率: 6.1mW

(mtfpmt)₂Ir(2-ylppy)



色度参数
CIE 色品坐标: x=0.4036 y=0.5491 u=0.1838 v=0.3752 duv=0.0574
相关色温: 4361K 主波长: 565.9nm 色纯度: 86.3% excitation purity
CRI 显色指数: Ra= 41.2
R1 =41 R2 =52 R3 =53 R4 =17 R5 =42 R6 =49 R7 =53 R8 =24
R9 =-114 R10=7 R11=-2 R12=25 R13=42 R14=78 R15=25
光度参数 Efficiency
光通量: 2.8701lm 光效率: 8.21lm/W 光辐射功率: 7.3mW

(mtfpmt)₂Ir(dfppy)



色度参数

CIE 色品坐标: $x=0.3625$ $y=0.4103$ $u=0.2014$ $v=0.3420$ $duv=0.0206$

相关色温: 4670K 主波长: 567.2nm 色纯度: 32.0% excitation purity

Dominant Wavelength

CRI 显色指数: $R_a=72.9$

R1 =65	R2 =74	R3 =88	R4 =73	R5 =67	R6 =70	R7 =86	R8 =60
R9 =-28	R10=45	R11=66	R12=54	R13=63	R14=93	R15=57	

光度参数

Efficiency

光通量: 0.090lm 光效率: 0.3lm/W 光辐射功率: 1.1mW