Supporting Information

Homoleptic *mer*-Ir(III) complexes for highly efficient solution-processable green phosphorescent organic light-emitting diodes with high current efficiency

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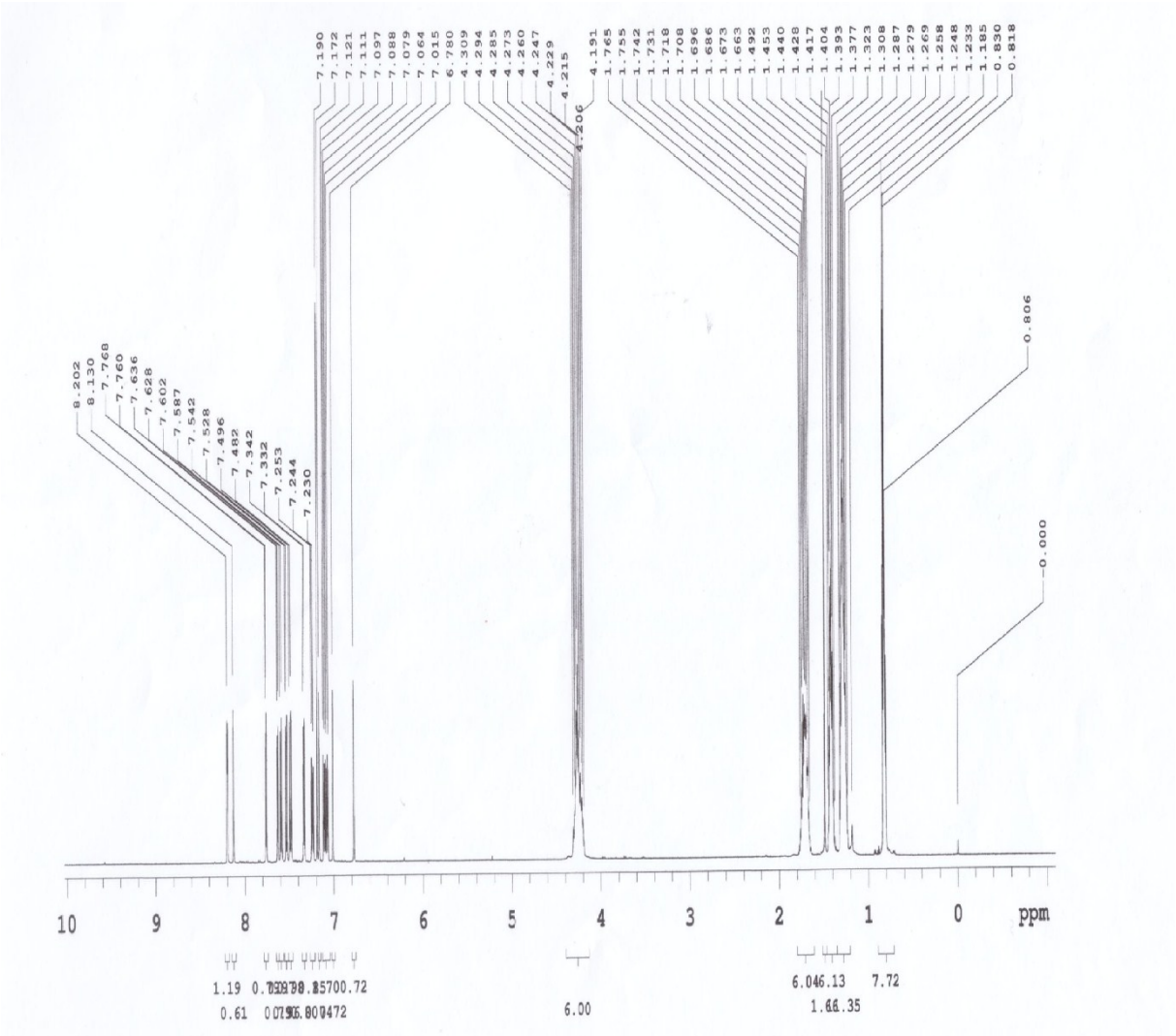
General information

All reagents and solvent were purchased from Aldrich Chemical Co. and Alfa Aesar and, used without further purification. All reactions were carried out in an inert and dry environment under anhydrous nitrogen (N_2) which was dried by passing through a column of calcium sulfate. ^{1}H and ^{13}C NMR spectra were recorded on a Varian Mercury Plus 600 MHz spectrometer in $CDCl_3$ using tetramethylsilane as an internal reference. The chemical shifts were reported in ppm relative to the singlet of $CDCl_3$ at 7.26 and 77 ppm for the ^{1}H and ^{13}C NMR, respectively. UV-visible and the emission spectra were recorded with a JASCO V-570 and Hitachi F-4500 fluorescence spectrophotometers at room temperature. The absolute PLQYs of the doped films were measured using spectroflurometer with an integrating sphere system (JASCO FP-8500) under an inert atmosphere. Thermal analysis was carried out on a Mettler Toledo TGA/SDTA 851e analyzer under N_2 atmosphere at a heating rate of 10 °C min^{-1}. CV studies were carried out with a CHI 600C potentiostat (CH Instruments) at a scan rate of 100 mV s^{-1} in an anhydrous CH_2Cl_2 solvent with 0.1 M $TBAClO_4$ as supporting electrolyte. A platinum wire was used as the counter electrode and an Ag/AgCl electrode was used as the reference electrode. The potentials were referenced to the ferrocene/ferrocenium redox couple (Fc/Fc^{+}). The purity of the Ir(III) complexes were determined by high-performance liquid chromatography (HPLC) carried out using from Agilent instruments.

(a)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9
8
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5
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3
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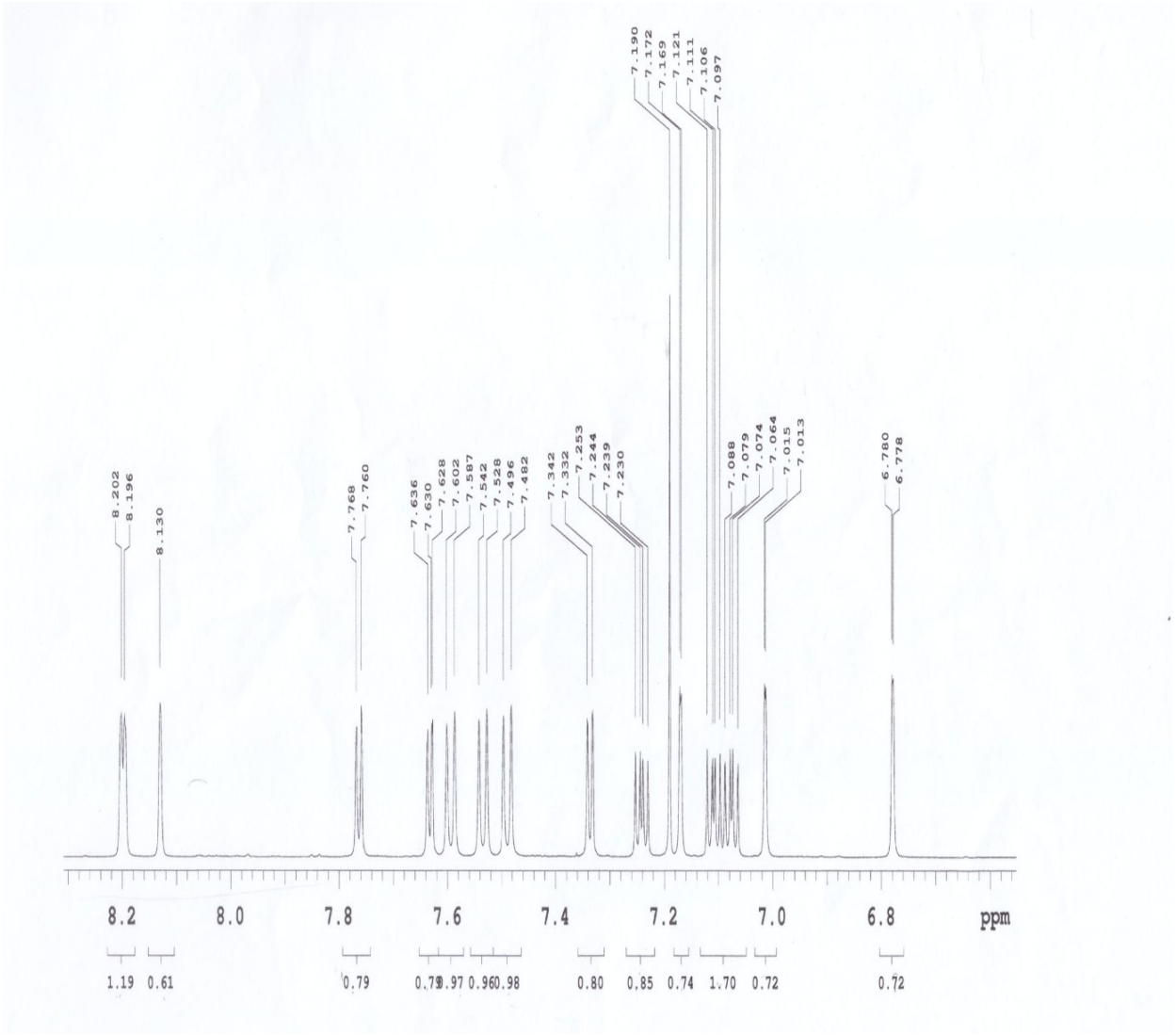
(b)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7.6
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ppm
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0.72

(c)

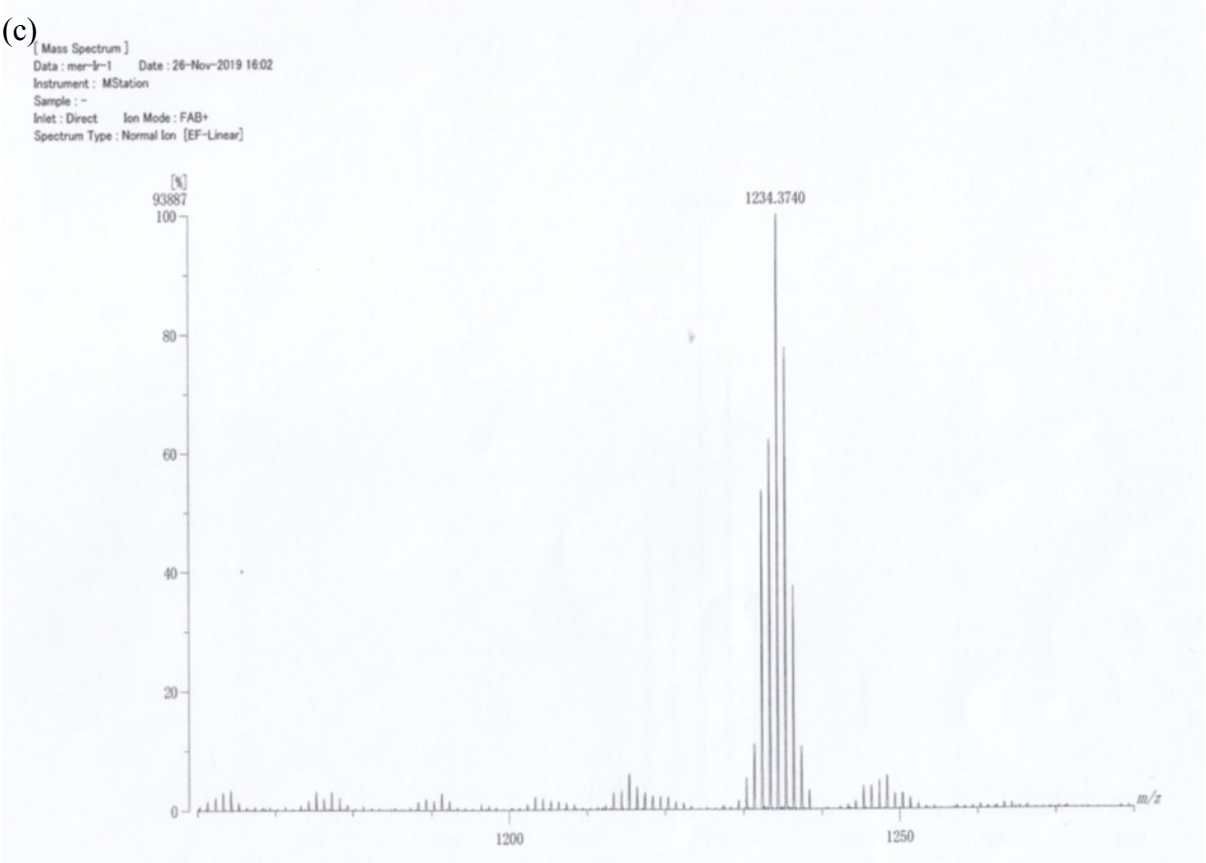
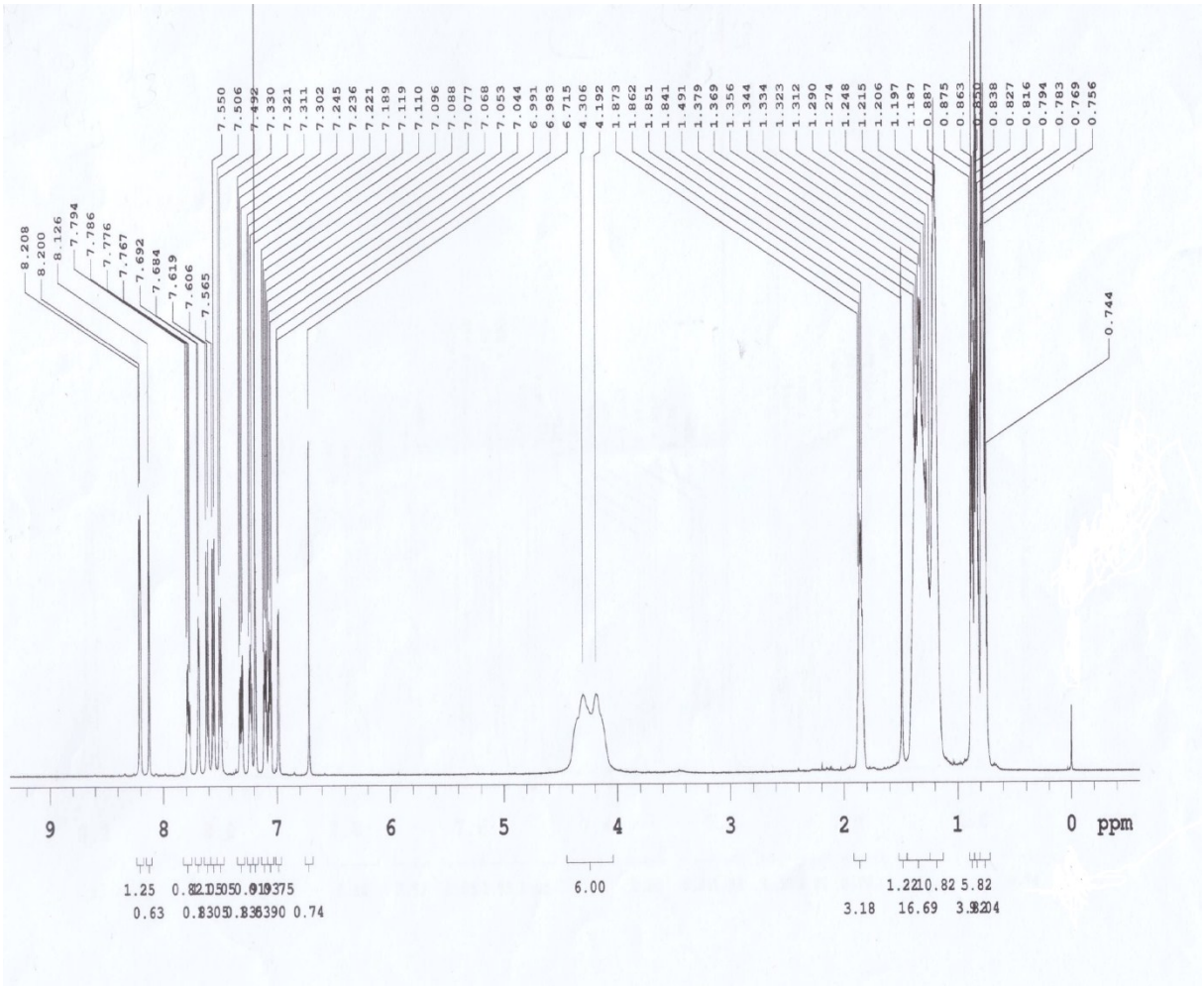


Fig. S1 a) ^{1}H NMR spectrum of ***mer*-Ir1** b) Aromatic region c) Mass spectrum of ***mer*-Ir1**.

(a)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1.215
1.206
1.197
1.187
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0.875
0.863
0.850
0.838
0.827
0.816
0.794
0.783
0.769
0.756
0.744
9
8
7
6
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3
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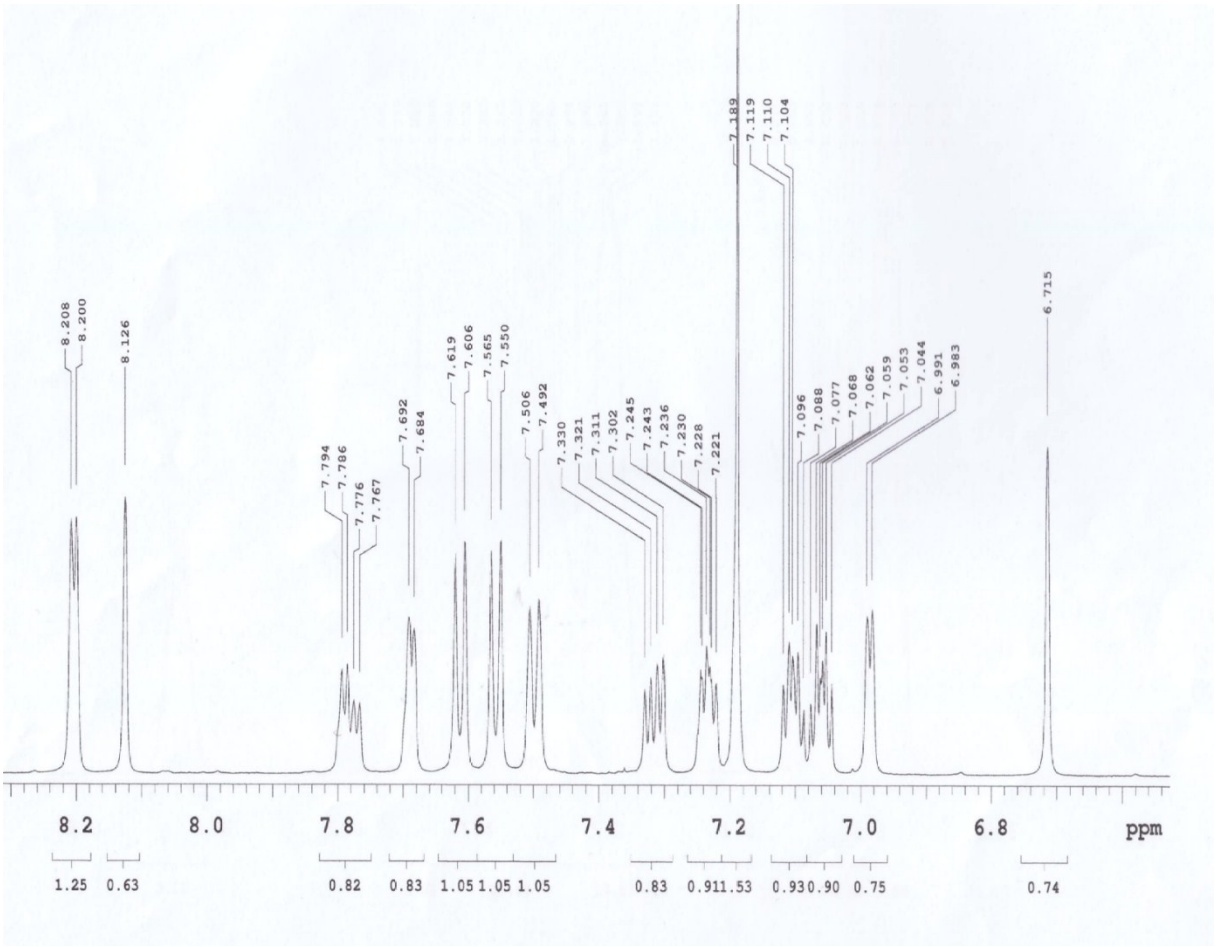
5.82

(b)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8.2
8.0
7.8
7.6
7.4
7.2
7.0
6.8
ppm
1.25
0.63
0.82
0.83
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0.91
1.53
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(c)

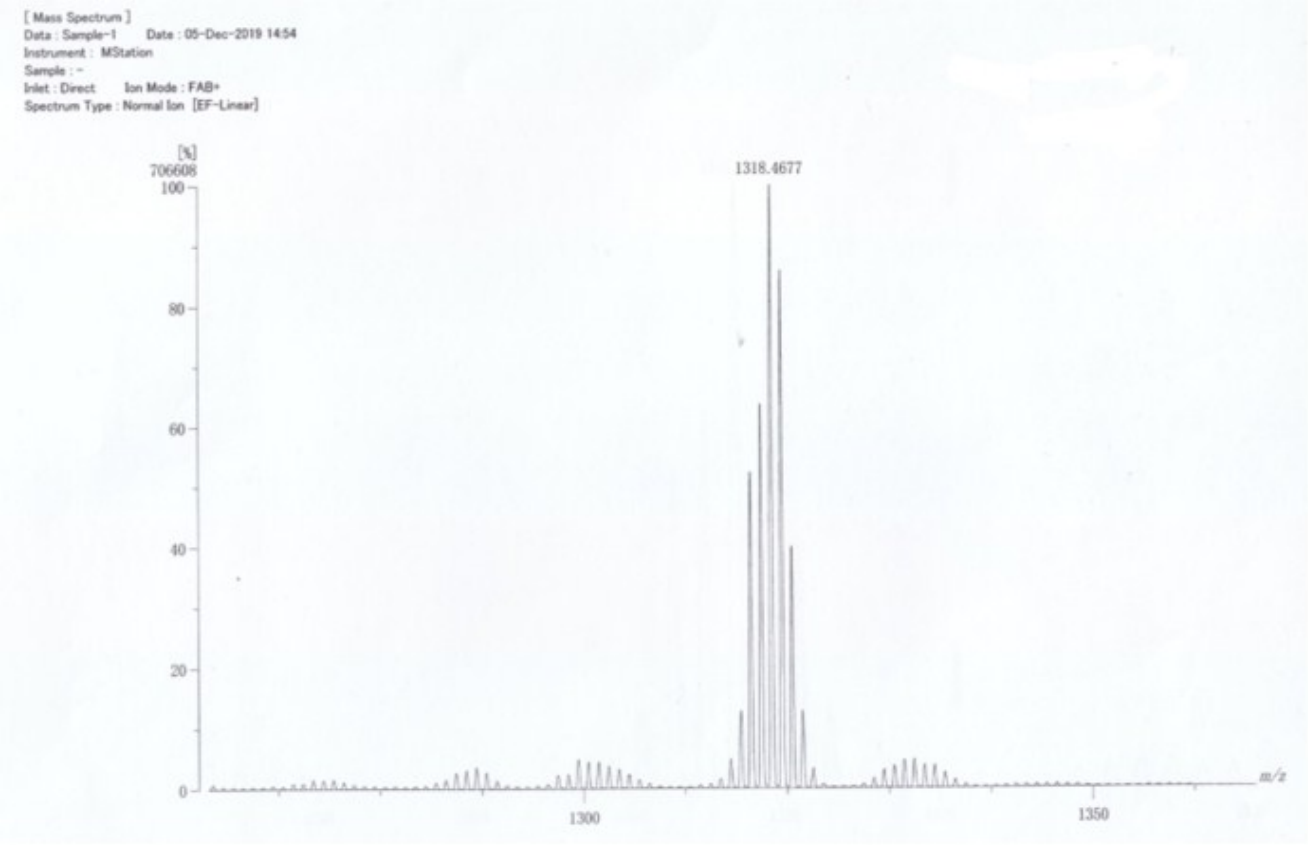
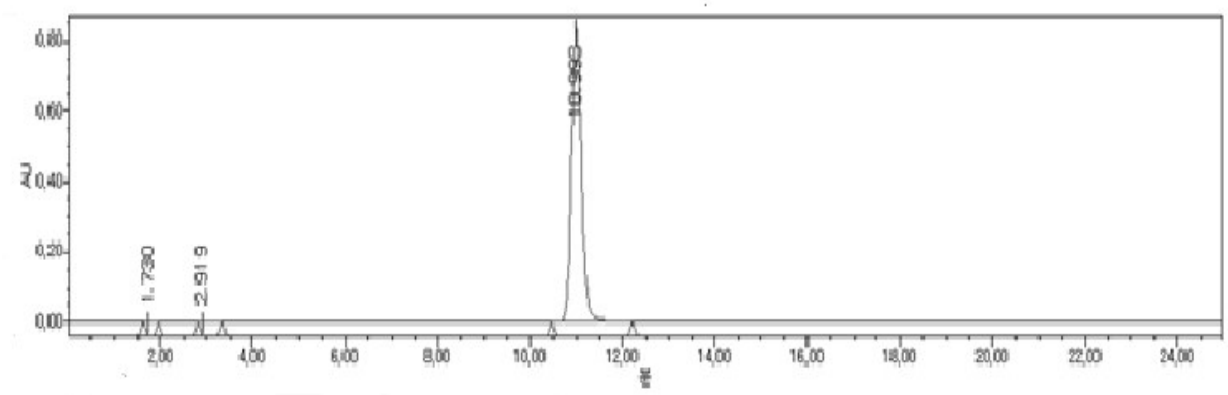
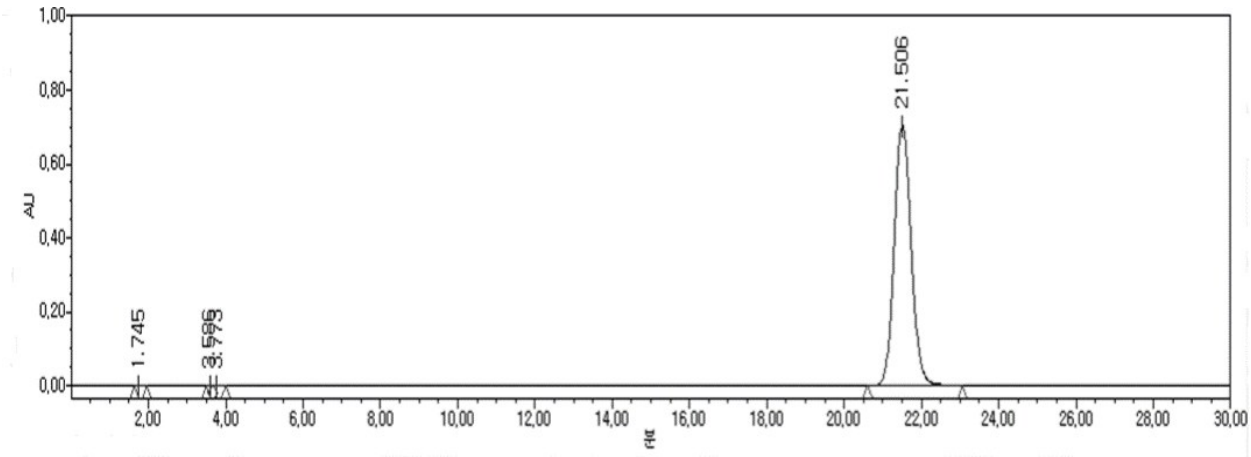


Fig. S2 a) ^{1}H NMR spectrum of ***mer*-Ir2** b) Aromatic region and c) Mass spectrum of ***mer*-Ir2**.



이름	머무름 시간 (분)	면적 (uV*초)	% 면적	높이 (uV)	적분 타입	양	단위	피크 타입	피크 코드
	1.730	12614	0.10	1518	BB			미지	
	2.919	9486	0.09	992	BB			미지	
	10.999	12990789	99.80	830062	BB			미지	



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	1,745	10227	0,05	1294	BB			미지	
	3,586	5011	0,02	1368	BV			미지	
	3,773	9872	0,05	1475	VB			미지	
	21,506	21478864	99,88	706163	BB			미지	

Fig. S3 HPLC spectra of compound ***mer*-Ir1** and ***mer*-Ir2**.

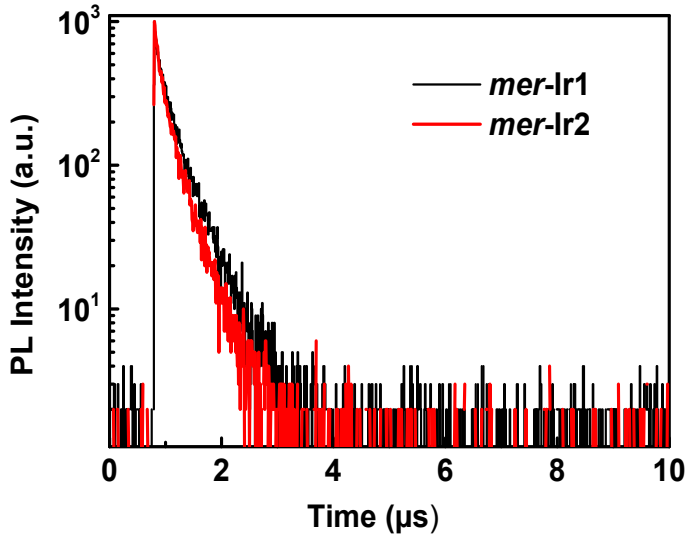

Fig. S4. Transient PL curves of ***mer*-Ir1** and ***mer*-Ir2**.

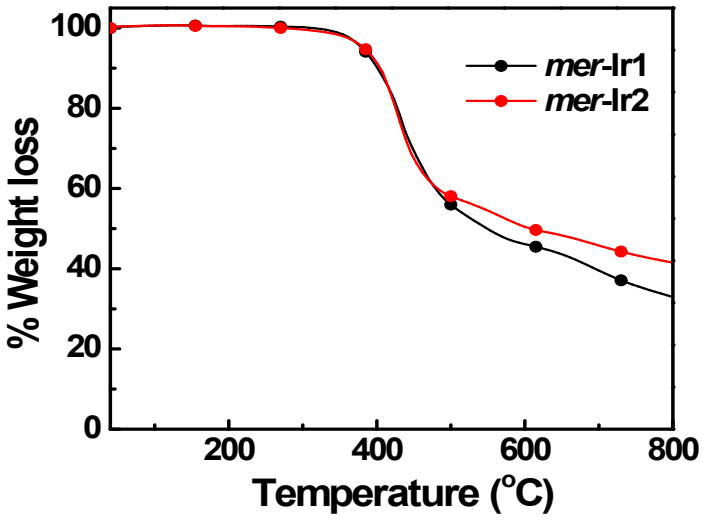

Fig. S5. TGA curves of ***mer*-Ir1** and ***mer*-Ir2**.

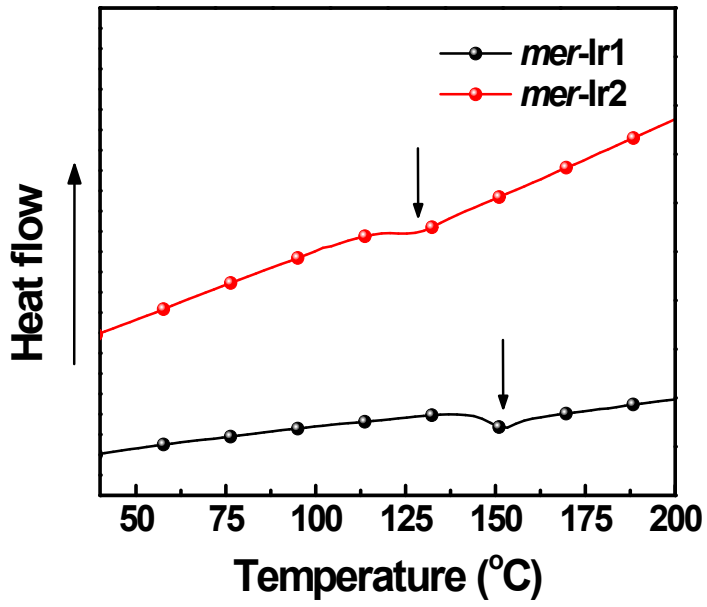

Fig. S6. DSC curves of ***mer*-Ir1** and ***mer*-Ir2**.

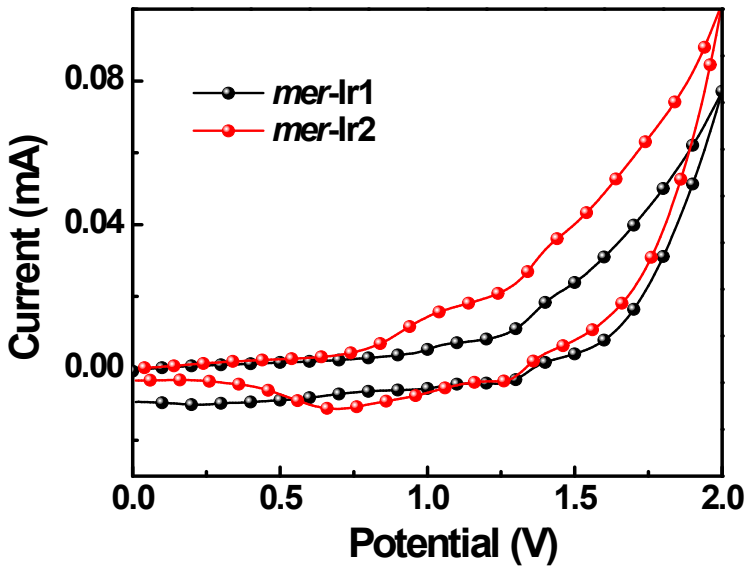

Fig. S7. Cyclovoltammetry curves of ***mer*-Ir1** and ***mer*-Ir2**.

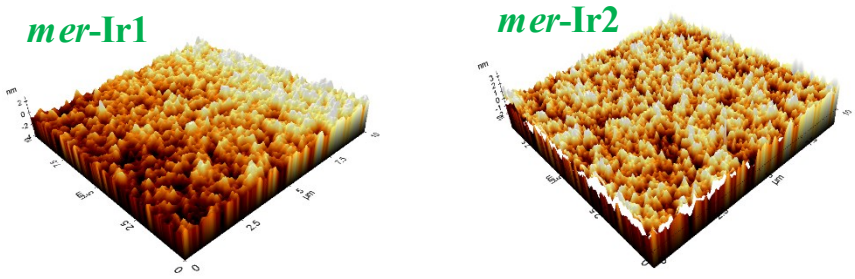

Fig. S8. Surface morphologies of solution processed films.

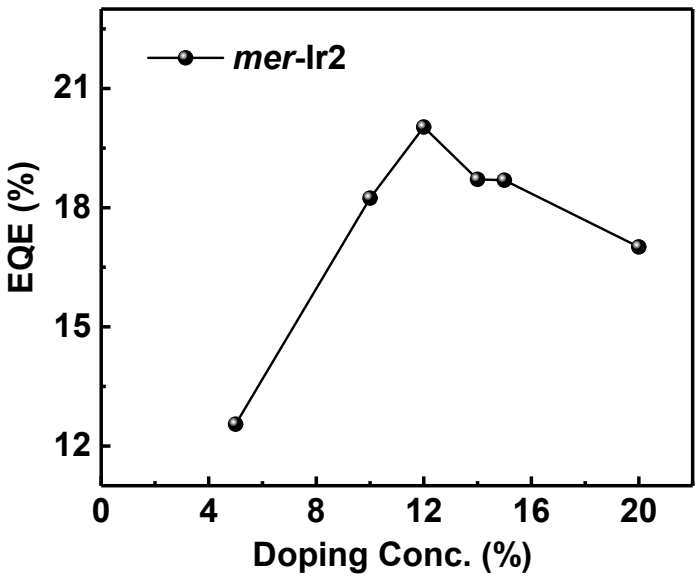

Fig. S9. EQE measured for different doping concentrations of *mer*-Ir2 complex.

Table S1. Literature summary of homoleptic green PHOLEDs via solution-processed.

Green Phosphors	EQE_{max} (%)	CE_{max}(cd/A)	Reference
***mer*-Ir2**	**20.03**	**67.81**	**This work**
fac-G0	18.1	62	[1]
fac-Ir(mppy)$_3$	16.3	56.9	[2]
fac-1c	12	40	[3]
fac-Ir(ppy)$_3$	15	56.8	[4]
fac-Ir(ppy)$_3$	-	27.4	[5]
fac-Ir(ppy)$_3$	-	27.3	[6]
fac-Ir(mppy)$_3$	22	69	[7]
fac-3c	12.9	37.6	[8]
fac-G1	15	51.8	[9]
fac- Ir-3Tz1F	15.8	56.2	[10]
fac-Ir(ppy)$_3$	-	42	[11]
fac-Ir(ppy-Cz)$_3$	7.8	23.0	[12]
fac-Ir(ppy)$_3$	11.4	38.71	[13]

References

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