

## **Cyclometallated platinum(II) complexes of 1,3-di(2-pyridyl)benzenes for solution-processable WOLEDs exploiting monomer and excimer phosphorescence<sup>†</sup>**

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### *Electronic Supplementary Information (ESI)*

- 1. IR spectra of complexes**
- 2. <sup>1</sup>H NMR spectra of complexes**
- 3. Contrasting influence of F atoms**
- 4. Influence of PVK electromer**
- 5. AFM data**

### 1. IR spectra of complexes as KBr pellet

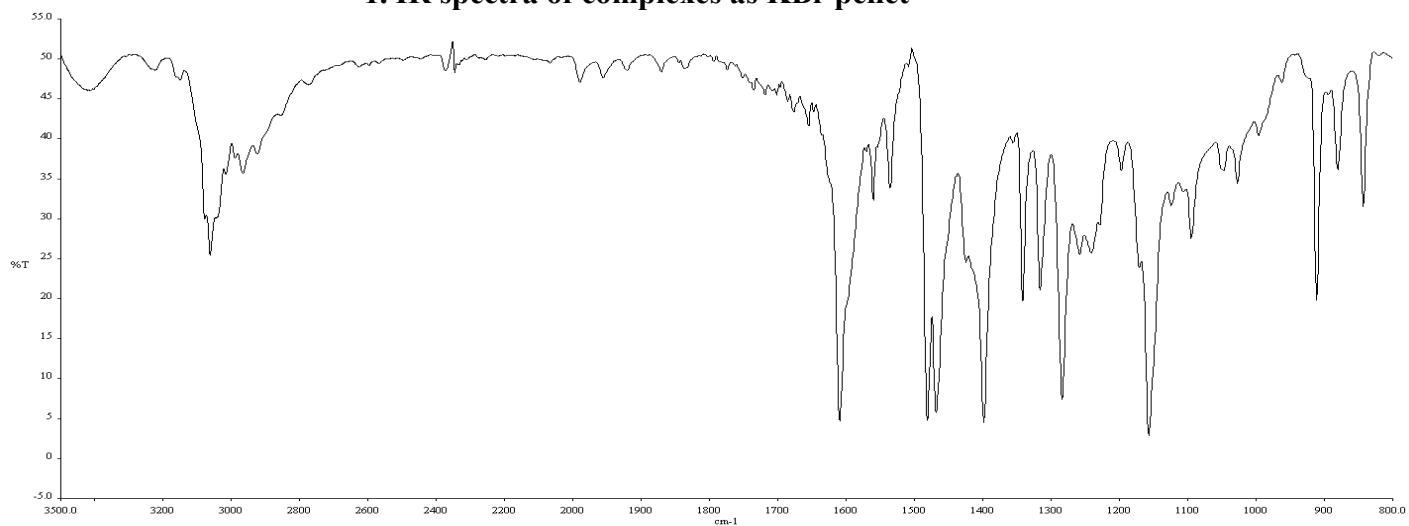


Fig. SI1 IR(KBr) spectrum of **FPTcI**

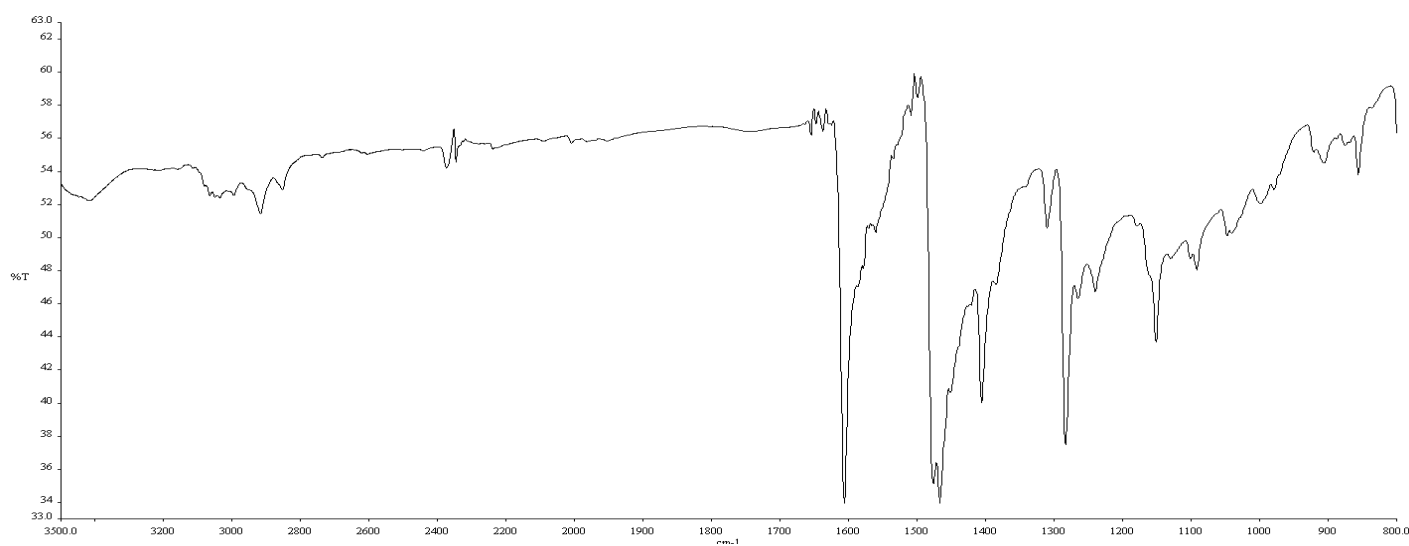


Fig. SI2 IR(KBr) spectrum of **MePtCl**

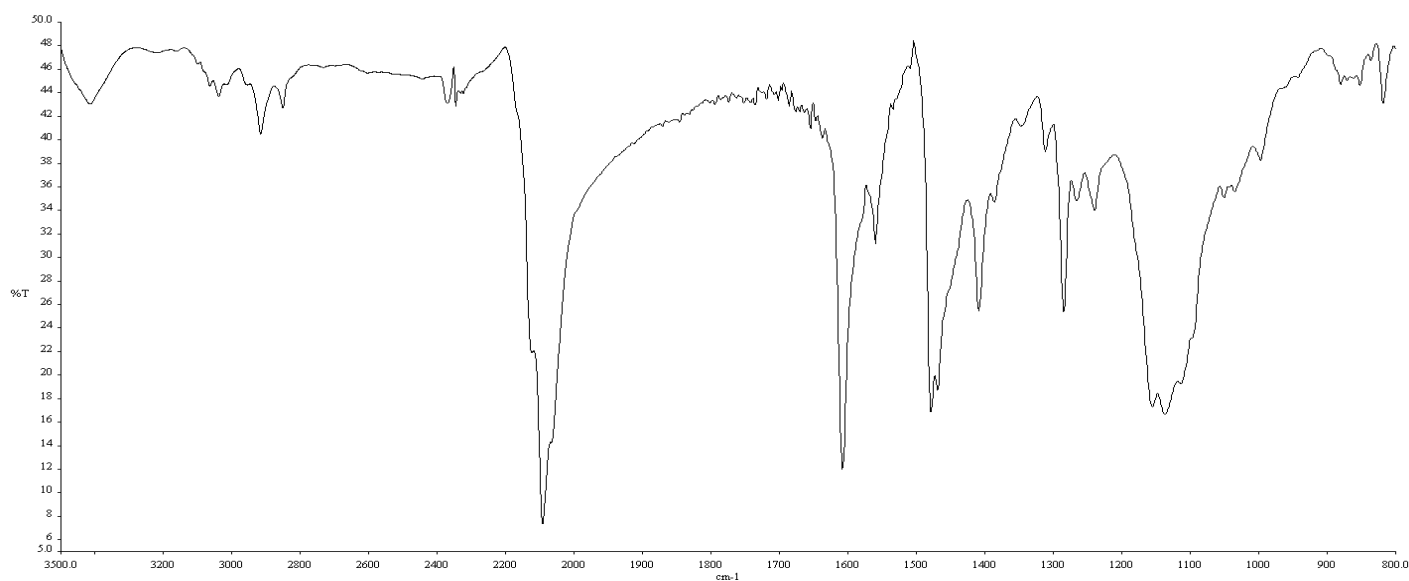


Fig. SI3 IR(KBr) spectrum of **MePtNCS**

## 2. $^1\text{H}$ NMR spectra of complexes

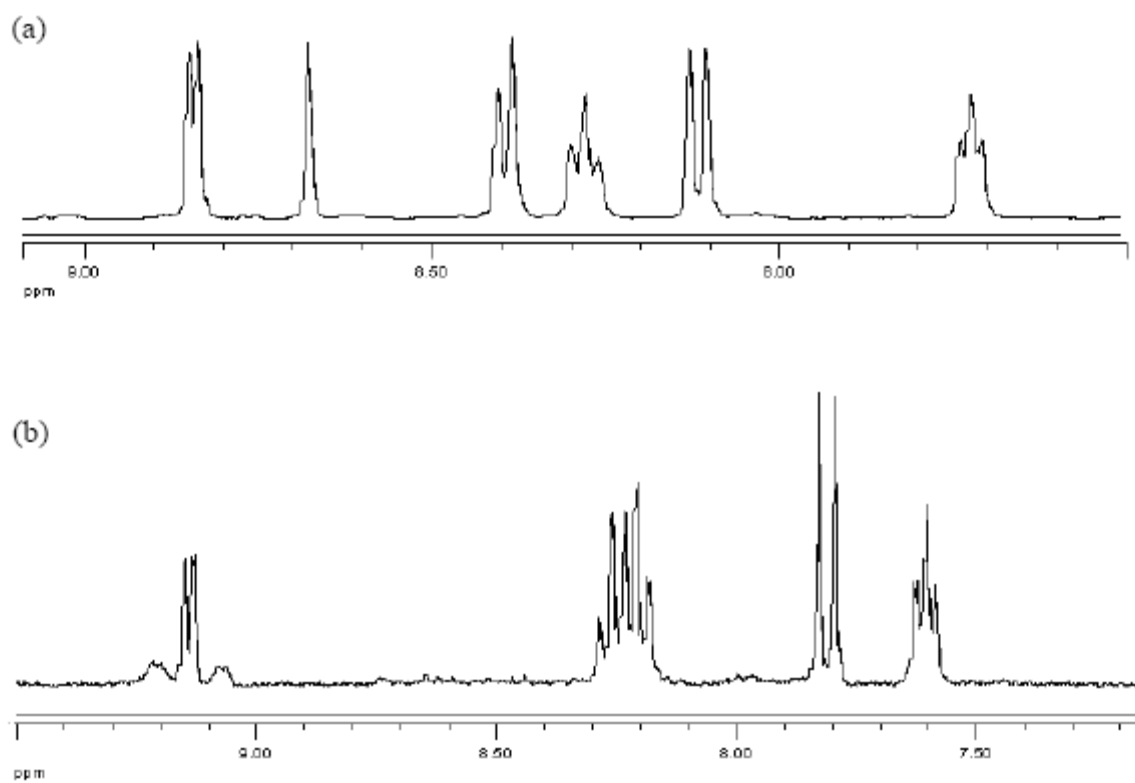


Fig. SI4. Aromatic region of  $^1\text{H}$  NMR (400MHz) spectra in deuterated dichloromethane of: a) the 5-fluoro-1,3-di(2-pyridyl)benzene ligand and b)  $\text{FPtCl}$

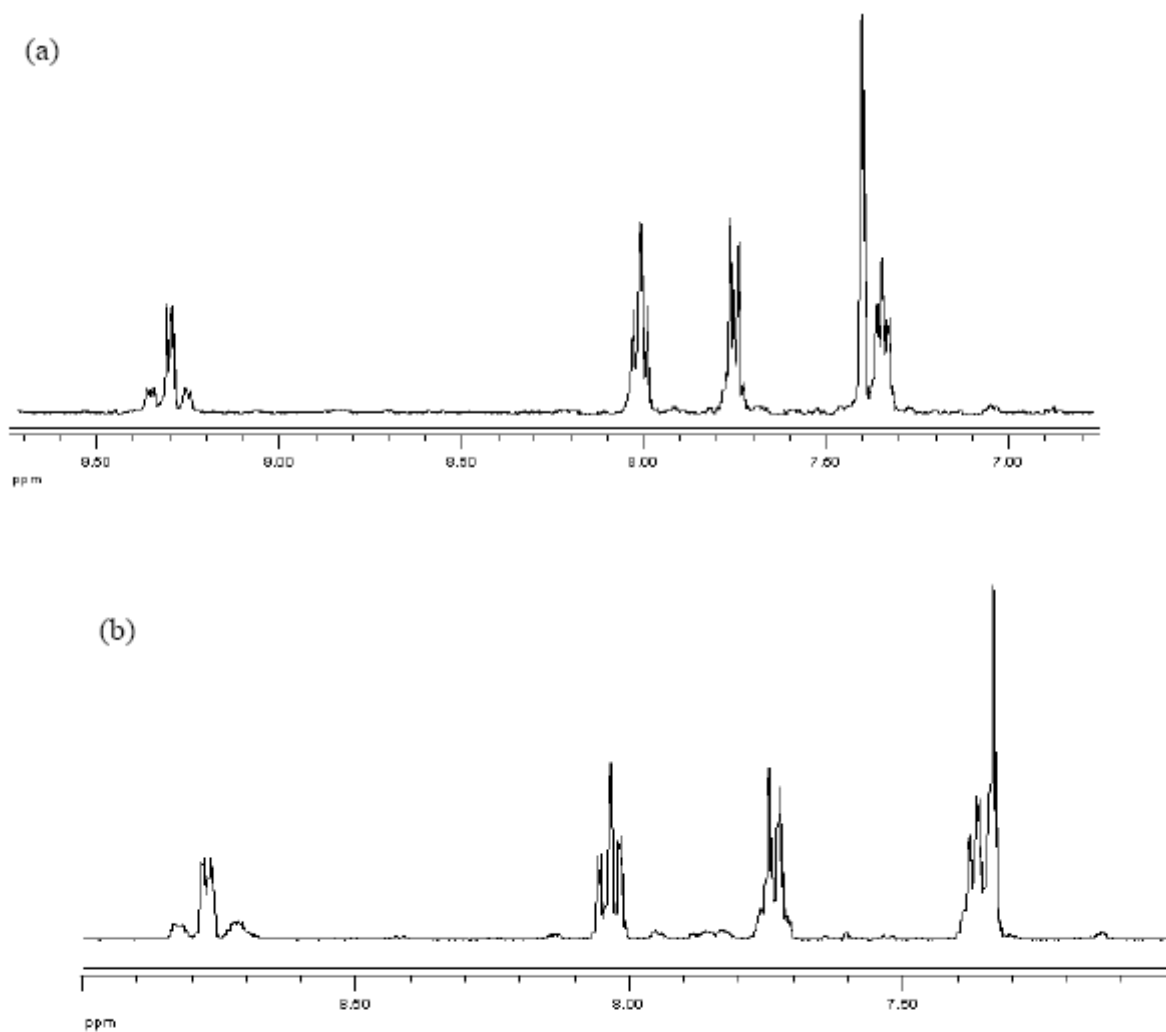


Fig. SI5. Aromatic region of <sup>1</sup>H NMR (400MHz) spectra in deuterated dichloromethane of:  
a) **MePtCl** and b) **MePtNCS**.

### 3. Contrasting influence of fluorine atoms in FPtCl and *m*-F<sub>2</sub>PtCl

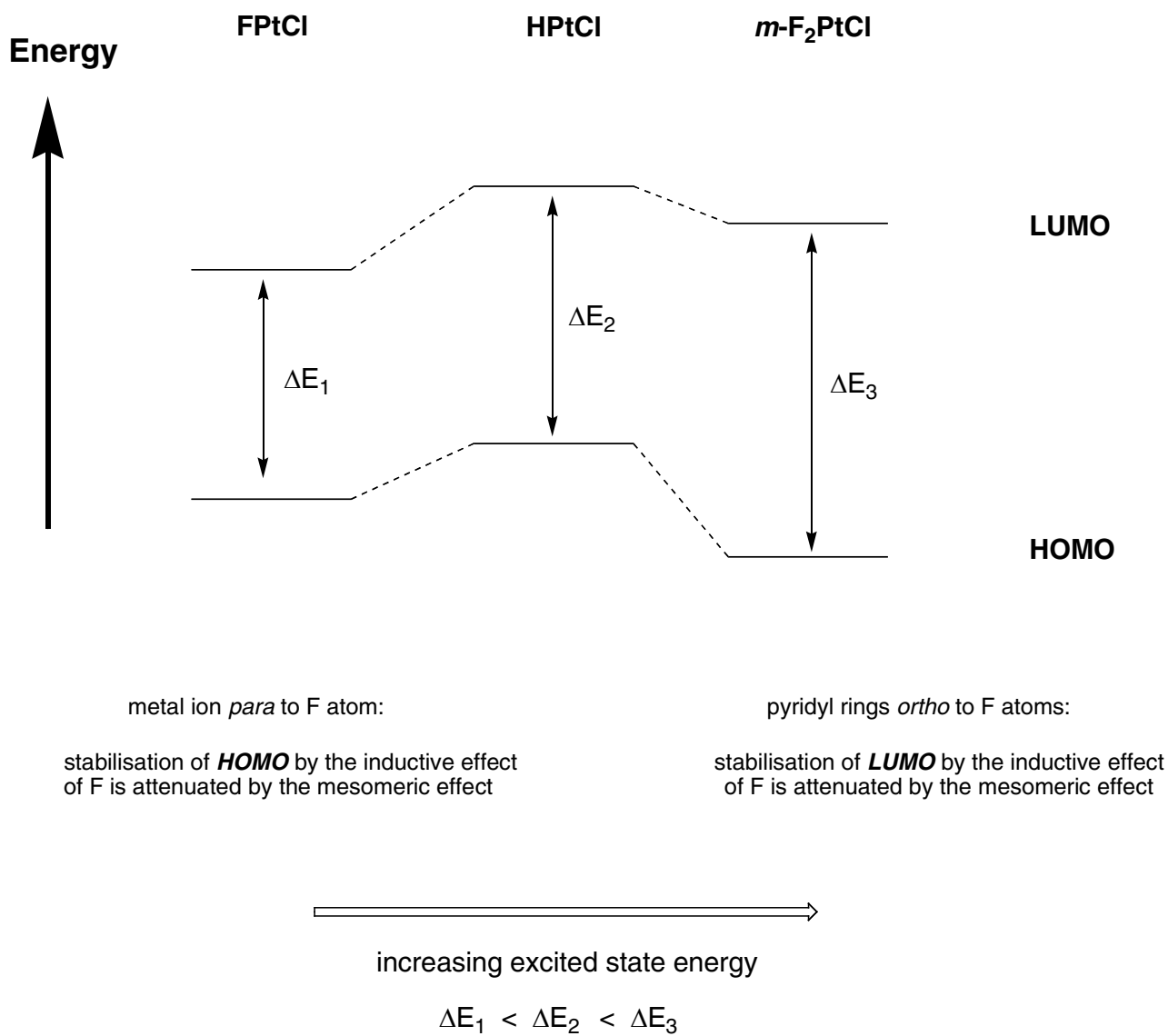


Fig. SI6. Schematic illustration of the expected influence of fluorine atoms on the HOMO and LUMO levels, according to their position (*meta* or *para*) relative to the C–Pt bond (not to scale).

#### 4. Influence of PVK electromer

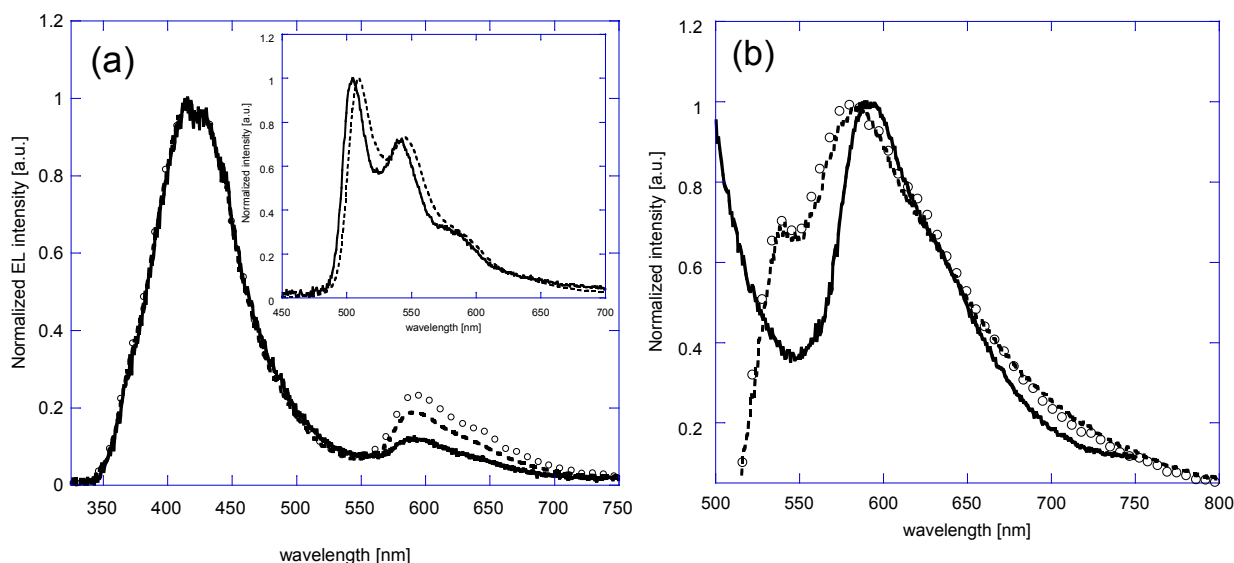
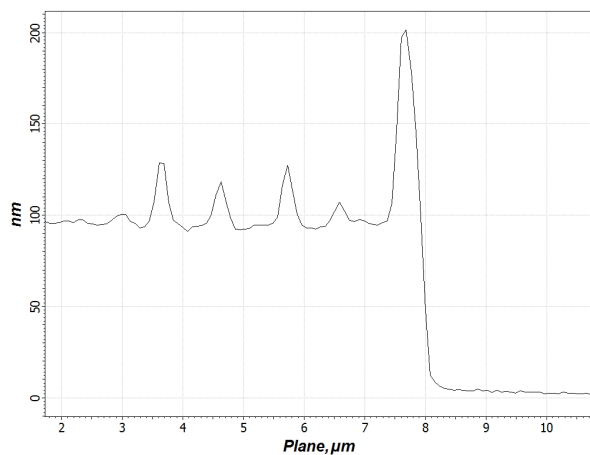


Fig. SI7(a) Normalized EL spectra of PVK-1 at 6V (solid line), 7V (dashed line) and 8V (circles). In the inset, a comparison of the PL spectrum of **FPtCl** in dichloromethane (solid line) and EL spectrum of the PVK-h/65%PVK-1:30%PBD:5%**FPtCl** device (dashed line) are shown. (b) Normalized spectra of PVK-1 electromer (solid line) with subtraction spectra of **MePtCl** (dashed line) and **MePtNCS** (circles) (explanation in the text).

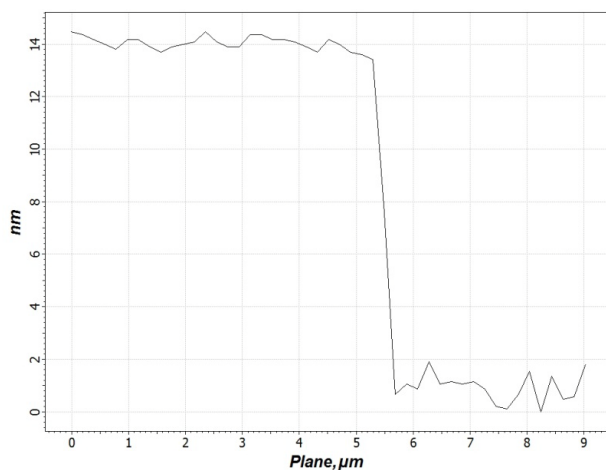
In order to prove the PVK electromer's contribution to OLEDs EL, we show additional data. In Figure SI6(a) EL spectra of PVK-1 are shown. While the blue part of the spectrum remains unchanged with increasing voltage, in the red spectral range a new band is emerging, the electromer emission. In the inset of Fig. SI6(a), the PL spectrum of **FPtCl** in dichloromethane (Fig. 1 in the article) is compared with EL spectrum of PVK-h/65%PVK-1:30%PBD:5%**FPtCl** device (Fig. 2 in the article). Both spectra are very similar to each other, without visible influence of PVK electromer. We stress here that the device had stable EL spectrum shape, insensitive to the applied voltage, and therefore we used it as a reference for EL spectra of OLEDs with the two other complexes. In Fig. SI6(b), PVK-1 electromer spectrum is presented together with subtraction spectra of **MePtCl** and **MePtNCS**. The last two were obtained by subtraction from the EL spectra of the diodes (Fig. 2 in the article) the EL spectrum of OLED with **FPtCl** as a dopant. The difference spectra obtained correspond well with PVK electromer band. Moreover the two results of subtraction are identical despite the difference between the EL spectra of devices doped with **MePtCl** and **MePtNCS** (Fig. 2 in the article). This suggests that the origin of the band visible after subtraction is independent of the type of complex used, but does depend on the matrix used, supporting the explanation in terms of electromer emission.

## 5. AFM data

52% PVK-h : 48% PFO film thickness:  $90 \pm 9$  nm



40% PVK-l : 20% PBD : 40% **FPtCl** film thickness:  $15 \pm 2$  nm



52% PVK-h : 48% PFO / 40% PVK-l : 20% PBD : 40% **FPtCl** film thickness:  $63 \pm 6$  nm

