Supporting Information

A new kind of peripheral carbazole substituted ruthenium(II) complexes for electrochemical deposition organic light-emitting diodes

By Yingying Zhu, Cheng Gu, Shi Tang, Teng Fei, Xin Gu, Huan Wang, Zhiming Wang, Fangfang Wang, Dan Lu and Yuguang Ma*

Fig. S1. $^1$H NMR spectrum of complex Ru(bpy)$_2$(dkte-bpy)(ClO$_4$)$_2$ in the CDCl$_3$ solution.

Fig. S1 shows the $^1$H NMR and spectrum of Ru(bpy)$_2$(dkte-bpy)(ClO$_4$)$_2$. All of the aromatic peaks corresponding to the bipyridine ligands as well as the carbazole groups are observed in the high-frequency region higher than 7 ppm along with the aliphatic peaks from the butyl moieties in the low-frequency region from 1 ppm to 5 ppm.
Fig. S2. MALDI-TOF-MS spectrum of Ru(bpy)$_2$(dkte-bpy)(ClO$_4$)$_2$.

Fig. S2 shows the MALDI-TOF-MS spectrum of Ru(bpy)$_2$(dkte-bpy)(ClO$_4$)$_2$. It clearly depicts molecular weight of 1101.1 and 1200.3 corresponding to the characteristic $[M - ClO_4^- + H]^+$ and $[M - 2ClO_4^- + H]^{2+}$ of this complex also in agreement with calculated molecular weight of 1100.2 and 1199.7, respectively.

Fig. S3. Electrochemistry polymerization curves of Ru(bpy)$_2$(dkte-bpy)(ClO$_4$)$_2$ in acetonitrile solution.

Fig. S3 shows the electrochemistry polymerization curves of complex Ru(bpy)$_2$(dkte-bpy)(ClO$_4$)$_2$ in acetonitrile solution from 0 to 0.97 V. The complex shows only one signal at 0.48 V in the first cycle, which is attributed to the reduction of dimeric carbazoles. While repetitive CV scans between chosen potential limits continuous, both signals of oxidation and reduction of dimeric carbazoles appear at 0.48 and 0.50 V, respectively, and the reversible couples turn lower in potential gradually but become more prominent with each scan.
Fig. S4. IR spectrum of complex Ru(bpy)$_2$(tkdp-bpy)(AsF$_6$)$_2$.

Fig. S5. IR spectrum of complex Ru(bpy)$_2$(dkte-bpy)(ClO$_4$)$_2$.
Fig. S6. IR spectrum of compound TCPC-6.

Fig. S7. IR spectrum of ED film with TCPC-6 and Ru(bpy)$_2$(tdpa-bpy)(AsF$_6$)$_2$. 