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Luminous efficiency enhancement of PVK based OLEDs with *fac*-[ClRe(CO)$_3$(bpy)]

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The luminous efficiency of organic light-emitting diodes based on poly(*N*-vinylcarbazole), PVK, was improved by adding *fac*-[ClRe(CO)$_3$(bpy)], bpy = 2,2′-bipyridine, to PVK host. Emissive layers with various Re(I) complex/host ratio were employed and optoelectronic properties were compared with the single PVK device. The single PVK device exhibits a characteristic electroluminescence with blue emission, λ_{max} 420 nm, assigned to the PVK excimer. On the other hand, the intense and broad band at λ_{max} 580 nm of the Re(I) complex/PVK OLEDs is ascribed to the metal-to-ligand charge transfer excited state emission of *fac*-[ClRe(CO)$_3$(bpy)]. At 30 V, the device luminous efficiency increased from 16 mcd/A for the single PVK device to 211 mcd/A for the 11% (w/w) Re(I) complex/PVK OLED, in which *fac*-[ClRe(CO)$_3$(bpy)] acts as an electron-trap in PVK films. The device current is space-charge limited and exhibits typical emissive layer thickness dependence.