Electroluminescence Study of Rare Earth Complexes

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Keywords: Photoluminescence, Electroluminescence, f-f transition, d-f transition

Abstract
Organic light-emitting diodes (OLEDs) have been successfully commercialized in the niche display market and are now under intense research for other applications, such as solid-state lighting. Though the research on rare earth complex based OLEDs can be traced back to 30 years ago \[1\], it is currently undeveloped, due to the poor thermal stability and long excited state lifetime of most f-f-transition rare earth complexes \[2\]. Recently, we demonstrated that d-f transition rare earth complexes represented by Ce(III) complexes (Figure 1) have many potential advantages as emitters in OLEDs \[3-7\]. For example, theoretical maximum exciton utilization efficiency up to 100%, short excited decay lifetimes in the nanosecond scale, and tunable emission colours. Moreover, these complexes are expected to be inexpensive because the abundance of cerium in Earth’s crust is even higher than that of copper.

References