

Prospects for Obtaining an Efficient Organolanthanide-based Infra-red Light Emitting Diode.

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Abstract

The rapid development of polymer and molecular-based light emitting diodes has resulted in a new generation of low cost displays currently entering the market place. The use of organolanthanide molecules as emitting centres in these devices was first suggested as a means of improving the colour purity of the emission utilising the sharp 4f-4f transitions of the lanthanide ion. The energy transfer process involved in exciting the lanthanide ion however also increased the theoretical quantum efficiency from 25%, typical for a conventional device, to 100% due to the large spin-orbit coupling induced by the heavy ion. Despite this advantage the highest reported efficiency to date is 1.4%. More recently infra-red emitting organolanthanide based diodes have been demonstrated though again reported efficiencies are low. In this paper the prospects of producing an efficient organolanthanide-based light emitting diode are discussed with an emphasis on those emitting in the infra-red.