

Sustainable Light-Emitting Electrochemical Cells

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Light emitting electrochemical cells are considered to be the future generation of lighting sources. When compared to any other solid state lighting devices, simple device architecture and air stable electrodes makes LECs impressive. In particular much research have been focused on cationic iridium complexes. But the rare and expensive nature of iridium demands new emitters in this field. So here we introduce a LEC device based on strongly luminescent phenanthroimidazole derivative as an active component. The device structure was literally similar to a conventional non-doped PLECs. The active layer consist of a tricomponent blend of organic molecule along with polyethylene oxide (ion transporting polymer) and Lithium triflate (inorganic salt). In contrast to ionic compounds based LECs, free ions are inevitable for electrochemical doping and the formation of PN junction in smLECs (small molecule light emitting electrochemical cells) which can be a limiting factor of non-ionic small emitters in LECs. However for the smooth functioning of the former demands additional ions in the form of ionic liquids. The constructed device achieved a brightness of around 125 cd/m^2 at around 9.9 V on a voltage sweep. The J-V characteristics reveals that the active material possesses good charge transporting ability.