INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

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Programme of Study	: Ph.D.
Thesis Title	: Design and Development of High Performance Polymer Light Emitting Diode for Solid State Lighting
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SHORT ABSTRACT

The thesis entitled "***Design and Development of High Performance Polymer Light Emitting Diode for Solid State Lighting***" deals with fabrication of Polymer Light Emitting Diode (PLED), especially which emits white light, using different approaches such as physical doping, electroplex formation and phosphor sensitized system. The effect of processing conditions on the device performance has also been investigated. The electron transport property of polyfluorene was enhanced by incorporating strong electron acceptor moiety 1, 8-naphthalimide into polyfluorene main chain and efficient blue and white PLEDs were fabricated using this newly synthesized copolymer as emissive layer. A detailed study on the effect of electron injection barrier and the electron transport property of the widely used poly(9-vinylcarbazole) (PVK) on the device parameters such as current density, brightness and electroluminescent spectra, especially the electroplex formation of PVK based PLED is also carried out. White light was successfully obtained utilizing the concept of electroplex formation in such devices by device optimization. The effect of the device processing condition such as annealing temperature and the effect of mixed host were studied and by optimizing the annealing temperature and doping ration of the mixed host, highly efficient green PLEDs were fabricated. Furthermore, by utilizing FIrpic as the blue emitter and the bridge of energy transfer and Rubrene and DCJTB as orange/red dopant, white PLEDs utilizing the concept of phosphor sensitized system was realized.