



INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI  
SHORT ABSTRACT OF THESIS

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Programme of Study : Ph.D.  
Thesis Title : Design and Fabrication of Rylene Diimide Based Active Materials, Devices and Applications.  
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The thesis entitled "***Design and Fabrication of Rylene Diimide Based Active Materials, Devices and Applications***" deals with synthesis of various Rylene Diimide based derivatives following a simple one step condensation reaction route. The derivatives N, N'-bis(cyclohexyl)naphthalene diimide (NDI-CY2) and N, N'-bis(methylcyclohexane)naphthalene diimide (NMeCy2) were successfully employed for the OFETs application using simple, cost effective fabrication techniques and demonstrating the influence of various combinations of inorganic/polymeric dielectric layers on device performances. The conjugated perylene diimide derivative appended with histidine side group, PDI-HIS was utilized for the detection of ammonia (NH<sub>3</sub>) vapors via fabricating a simple two terminal sensor device. A new derivative of cationic naphthalene diimide, N, N'-bis(3-imidazolium-1-ylpropyl)-naphthalenediimide diiodide (NDMI) was developed for its application in detection of nitroexplosive picric acid (PA) both in aqueous and vapor phase. Furthermore, an economical and portable electronic prototype was established for visual and on-site detection of PA vapors under exceptionally realistic conditions