

Internal Seminar

Studies on the versatile roles of Polyaniline and its composites in polymer based optoelectronic and energy storage devices

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Polyaniline (PANI) is one of the highly sought after conducting polymers, in enriching the research arenas of current technological significance. The first phase of the talk encompasses the detailed structural, morphological and electrical characterisation of highly crystalline, homogeneous and conducting films of acid doped polyaniline, cast on glass substrates with the aid of a level surface. The synthesis of polyaniline, embedded with metal nanoparticles, both in powder and thin film forms and their detailed linear and nonlinear optical studies constitute another major part of the first phase of investigations. The second phase of the talk is devoted to exploring the energy storage capabilities of polyaniline and its composites. To start with, Li enriched polyaniline samples were synthesized and were used as cathodes for assembling Li-ion cells. To improve the cell performance, composites of PANI with conventional inorganic cathode materials including LiFePO_4 and LiMn_2O_4 were synthesized and their electro chemical capabilities were studied. The maximum specific capacity observed is around 50 mAh/g. With the ambition of making all solid state, flexible Li-ion cells, lithium salt dissolved PEO based solid electrolyte with good Li-ion conductivity was synthesized and the Li-ion transport studies in this system were carried out. The maximum ionic conductivity obtained is around 1.53×10^{-3} S/cm which is close to that of conventional liquid electrolytes. The pouch cells assembled using lithiated PANI as cathode are found to hold the open circuit voltage (OCV) even when bent up to 90° from the initial state. This will open up a new methodology to realize all solid state, flexible and environmentally friendly, polymer-based lithium ion cells.

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2:00 PM (Tea/Coffee at 1:45 PM)

Seminar Hall, TCIS