INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

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Thesis Title:
Liquid Membrane based Technology for the Separation of Toxic Heavy Metals from Industrial Effluents

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SHORT ABSTRACT

This thesis aims at exploring the efficacy of LM technology for the separation and pre-concentration of Cd(II) and Pb(II) from their aqueous solutions. A suitable LM that can extract the said solutes is identified through equilibrium study. Experimentation with various solvents and carrier agents reveal that the coconut oil-Aliquat 336 and coconut oil-D2EHPA are two favorable combinations for separation of the cadmium (II) and lead (II). The performances of various LM based processes are investigated. The processes include the techniques based on Bulk Liquid Membrane (BLM), Flat Sheet-Supported Liquid Membrane (FS-SLM) and FS-SLM assisted simultaneous precipitation of lead (II) and cadmium (II) in stripping chamber and also the electro-deposition of target metals on the cathode plate placed in the stripping chamber. The extraction and recovery of cadmium (II) through BLM configuration were found to be 72% and 64%, respectively. Further experimentations through BLM were conducted for transportation of lead (II) with the same set of operating parameters. Both the extraction (82%) and recovery (77%) are found comparatively higher for lead (II) as compared to that of cadmium (II). The methodologies for extraction and diffusion processes through FS-SLM remain the same primarily. Transportation of cadmium (II) and lead (II) were accomplished in FS-SLM based simultaneous separation and electro-deposition prior to its recovery as precipitation and electroplated product. At the optimum condition, *i.e.* pH of 4, electric potential of 2.5 V and area of cathode plate of 16.20 cm^2, the deposition of cadmium (II) was found 72% as compared to 88% of lead (II). Separation efficiency was improved by increasing the driving force to mass transfer in both the cases *i.e.* precipitation and electroplating methods.