



INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

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Programme of Study : Ph.D.

Thesis Title: **Studies on the Development of Waste Plastic Based Hydrophilic Membranes for Ultrafiltration Applications**

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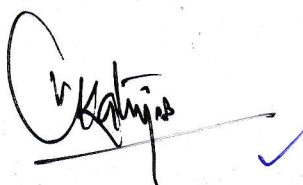
Thesis Submitted to the Department/ Center : Chemical Engineering

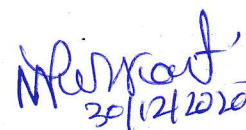
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SHORT ABSTRACT

Plastic utilization overtook other materials for its outstanding properties and advantageous characteristics. This has no doubt increased the amount of waste plastic generated in the world and has risen concern over its effects on the environment. This work shows the feasibility of the utilization of waste plastic as a membrane precursor and its application in the ultrafiltration process. The main aim of the work is to utilize waste polyvinyl chloride (PVC) as a precursor for membrane fabrication with surface modification by using sustainable polymers for effective utilization. Waste derived PVC was blended with various additives (polyethylene glycol, polyvinylpyrrolidone, cellulose acetate, gum arabic) to overcome the hydrophobic nature of PVC in membrane fabrication, the outcomes are discussed in independent chapters. The membranes were prepared via phase inversion method induced by non-solvent. The characterization of the membranes was done using various techniques including field emission scanning electron microscopy, Fourier transform infrared spectroscopy in attenuated total reflectance mode, thermo-gravimetric analysis, mechanical properties and measurement of water contact angle. The membrane performance was assessed by water flux (PWF) and bovine serum albumin (BSA) and natural organic matter removal in water, respectively. Thus, this study gives insights that waste PVC can be utilized for membrane fabrication and its subsequent application in the ultrafiltration process.




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