

## **Project II**

### **ABS-PVA based ultra filtration membrane for high mechanical and water filtration applications**

#### **Abstract**

Membrane filtration is applicable in food industry, haemodialysis, protein purification, waste water treatment and for the pre-treatment of water in reverse osmosis process etc. Due to lower energy consumption, reduced capital cost and ease of operation makes membrane separation a much attractive techniques than other conventional methods. Polymer membranes in separation and purification processes are gained much interest for the last two decades. The search of polymers with high separation efficiency, excellent mechanical strength, chemical and thermal resistance is gained much interest topic of research. Acrylonitrile butadiene styrene (ABS) is high toughened thermoplastic terpolymer having high chemical and thermal resistance. ABS based ultra filtration membrane for high mechanical and water filtration application is prepared by phase inversion method. Polyvinyl alcohol (PVA) is a hydrophilic polymer being selected to get high porosity to the membrane system. The casting solution is prepared by dissolving ABS and PVA in Dimethyl formamide (DMF) at 60°C. with stirring of 6 hours. The composition of ABS is fixed at 15 % and the % of PVA is varied as 0, 2, 4, 6, and 8%. The solution is sonicated for 30 min to remove the air bubbles. The solution was casted on a clean glass plate to applicator with a clearance of 200µm. The glass plate is then immersed in a distilled water coagulation bath without any evaporation deliberately. The resultant thin polymer film were separated from the glass surface within a few seconds and leached overnight to remove any traces of solvents. FESEM is used to observe the ABS and ABS/PVA membranes. FTIR and UV spectroscopy will be performed on the sample. Contact angle of the membrane were proposed to be observed. Stirr cell experiment for water filtration and TGA analysis will be determined. Mechanical properties of the system will be studied using a universal testing method. Compare the water filtration properties of ABS/PVA based membrane with ABS/PEG based membrane.

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