Preface

Significant advances in polymeric membrane materials for various separations have been witnessed in the past decade. Nearly hundreds of polymer materials have been engineered and their unprecedented transport properties could enable an energy-efficient route for large-scale desired separations. Presently, a lot of commercial membranes are available, made of various polymers, such as cellulose acetate, polytetrafluoroethylene, polysulfone, polyacrylonitrile, polyethylene, polyvinyl chloride, polyethersulfone and polyvinylidene fluoride. Many researchers have done studies to prepare porous polymeric mix matrix membranes using many different nanomaterials like titania, silica, zirconia, alumina, silver oxide, zinc oxide etc. to investigate their effect on antifouling properties and performance of the membrane. Incorporation of these nanomaterials increases pore structure, higher hydrophilicity, surface morphology, strength which in turn results in better performance and antifouling nature of membrane. However, there is less published informationon about polyvinyl chloride based composite membranes using alumina and bentonite nano particles to enhance its antifouling properties.

Polyvinyl chloride is one of the widely used polymers worldwide for different applications because it is inexpensive, possesses excellent chemical properties such as acid and alkali resistance, high mechanical strength good thermal properties. Because of these properties, it is an excellent material for membrane preparation; however, it has a drawback of higher hydrophilicity which is not accepted in the membrane separation process for water purification.

This thesis is about synthesis, characterization and application of polyvinyl chloride based composite membranes using alumina and bentonite nano particles as additives to

improve membrane properties and performance. Performance studies of prepared membranes were done on a lab scale dead end filtration set up by using aqueous humic acid solution.

This thesis has been organized in six chapters as listed below:

Chapter 1 deals with general introduction of membrane separation processes and membranes.

Chapter 2 involves a brief literature review of polymeric composite membranes.

Chapter 3 includes the materials and methods involved in research work. Membrane preparation method, different instrumental techniques and filtration experiment procedure used in research work are described in brief.

Chapter 4 is about synthesis, characterization and application of PVC/Nano alumina composite membrane.

Chapter 5 deals with synthesis, characterization and application of PVC/Nano bentonite composite membrane.

Chapter 6 contains summary and conclusion of thesis.

References

Publications