UNIVERSITI TEKNOLOGI MARA
Cawangan Terengganu
Kampus Bukit Besi

TITLE:

PRELIMINARY MECHANICAL PROPERTIES STUDY ON ADDITION OF TITANIUM DIOXIDE NANOPARTICLES INTO POLYSULFONE SUBSTRATE FOR DESALINATION APPLICATION

SUPERVISOR:

MR HAIKAL BIN MUSTAFA

SCHOOL OF CHEMICAL ENGINEERING
COLLEGE OF ENGINEERING

2024

AUTHOR'S DECLARATION

" I hereby declare that this report is my own work except for quotations and summaries which have been duly acknowledged."

Name of Student	:	Nor Adliana Qistina Binti Ruzi
Student I.D. No.	:	2022603098
Programme	:	Diploma in Chemical Engineering
College/School	:	College of Engineering/School of Chemical Engineering
Signature of Student	:	
Date	:	10 January 2025

ABSTRACT

The Earth surface mostly covers about 71% water where only 0.5% known as fresh water that safe to be use for drinking while the balance is categorized as sea water. The population of human lives increasing over years; hence, the demands of fresh water also increase for daily used consumption. In order to produce fresh water, the desalination process by using reverse osmosis method has been chosen where it is known as a process to remove the dissolved salts from the sea water with low cost and low energy consumption. From the previous study, fabrication of Polysulfone (psf) substrate with nanoparticles such as Titanium Dioxide (TiO_2) have successfully increased salts rejection. In terms of mechanical properties, the addition of Titanium nanoparticles contributes in increasing the strength of the membrane. For this study, initially, dope solutions which contains 15% of Polysulfone (psf), 84.5% of N-methyl-2-pyrrolidone (NMP), 0.5% of Polyvinylpyrrolidone (PVP) and 0.002% of Titanium Dioxide (TiO_2) were prepared to fabricate Polysulfone substrate. Afterwards, mechanical analysis such as tensile testing took place to investigate the strength of the membrane. The result showed membrane with addition of single layer of Titanium nanoparticles has higher tensile strength at 1.42 MPa compare with control sample which is 0.77 MPa. In conclusion, addition of Titanium Dioxide (TiO_2) helps to increase the mechanical properties of the membrane.

TABLE OF CONTENTS