



Cavangan Terengganu Kampus Bukit Besi

FINAL YEAR PROJECT (CHE365)

TITLE:

PREMILINARY MECHANICAL PROPERTIES STUDY ON DOUBLE LAYER IN POLYSULFONE SUBSTRATE WITH TITANIUM DIOXIDE NANOPARTICLE FOR DESALINATION PROCESS

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AUTHOR'S DECLARATION

I, MUHAMMAD HARRAZ B.MOHD SHAHARUDIN, solemnly declare that the work presented in this final year project, titled premilinary mechanical properties study on double layer addition of titanium dioxide nanoparticle in polysulfone substrate for desalination process, is my own original effort and has not been submitted for any other academic purpose. All sources of information and assistance used in this project have been duly acknowledged, and the work conforms to the ethical standards set forth by the Academic Rules and Regulations for Postgraduate, Universiti Teknologi MARA

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<u>ABSTRACT</u>

The earth consists of 71% water and 30% land. The water content of the human body is about 60%, which is why it is important to drink fresh water to maintain the healthy condition. However, as as population growth, environmental contamination and clean water treatment still exist; people must consider alternate water sources; one of the techniques under use by researchers is desalination. This method uses reverse osmosis (RO) as the desalination process. This study investigates the preliminary mechanical properties of double layer with nanoparticle(TiO2). The research begins with the preparation of a solution using polysulfone (Psf) as the main component to fabricate substrate with, and the prepared layer was dried to prepare it for the mechanical testing. The three samples were tested with a tensile machine and the result is good. The result is compare with double layer polysulfone without nanoparticle to gain a better result. The result show that opposite of what expected and the structure of membrane I change according to presence of nanoparticle.

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1.BACKGROUND OF STUDY

1.1 Introduction

Seawater, which consists of about 96.5% water and 3.5% dissolved salts, mainly sodium chloride, is not safe for direct human consumption due to its high salt content. Drinking seawater can lead to dehydration as the salt content is too high for the human kidneys to process effectively. When seawater is drunk, the body requires more water to excrete the excess salt than is contained in the seawater itself, ultimately resulting in a net loss of fluid ("Can You Make Seawater Drinkable?," 2024).

In Malaysia, people facing with the problem with water supply such as population growth,pollution, climate change and others. Malaysia lost an estimated 1.7 billion US dollars in wasted water between 2018 and 2022. The supposedly low cost of water combined with climate pressures are exacerbating water scarcity. Not only that, Malaysia likely will face a water crisis in 2030. This crisis is worried as other country already apply and manage their own system to convert seawater into fresh drink(Selan, 2024).

Beside that, according to researcher call Ninimesh Desh, Water scarcity is the biggest problem around the globe. It is due to two converging phenomena which is growing freshwater consumption and depletion of usable freshwater resources. The writer also state that the easiest system to convert seawater to fresh air is using desalination process reverse osmosis(RO) method (Nirnimesh De*, Sraban Banerjee Department of Mechanical Engineering, Jadavpur University). Not only that, Johny B. Tonner (Desalination in America, 2021) state that desalination method is mot weird and already apply in industry for grow more big and advanced. According to International Desalination Association, have approximately 10000 desalination facility in worldwide(Desalination in America, 2021).

Reverse osmosis (RO) desalination is an effective process for converting seawater into fresh water, which is crucial for combating water scarcity. The process begins with the extraction of seawater, followed by pre-treatment to remove impurities and