A REVIEW ON THE PREPARATION OF SUPERHYDROPHOBIC POLYPROPYLENE COATING

NIK RUSLIANTY BT NIK RUSLY

Final Year Project Report Submitted in
Partial Fulfilment of the Requirements for the
Degree of Bachelor of Science (Hons.) Applied Chemistry
in the Faculty of Applied Sciences,
Universiti Teknologi MARA

AUGUST 2022

ACKNOWLEDGEMENTS

Firstly, I would like to give all the praise to Allah S.W.T. for giving me strength and opportunity to be able to finish this thesis in the given time, and for giving me patience in completing this long and challenging journey.

Secondly, my gratitude and thanks go to my supervisor Dr Siti Nor Din for her marvellous supervision, guidance and encouragement. Sincere gratitude is extended to her generous participation in guiding, constructive feedback, kind support, and advice during my degree. A special thanks also to my colleagues and friends for their encouragement for this project.

Finally, this thesis is also dedicated to my parents and my siblings as a whole for their continuous support and understanding while I was doing study and writing my thesis. Your prayers for me have kept me going this far.

(Nik Ruslianty Bt Nik Rusly)

ABSTRACT

THE PREPARATION OF SUPERHYDROPHOBIC POLYPROPYLENE COATING

The self-cleaning properties of superhydrophobic surfaces have attracted a lot of attention from both the academic and industrial sectors. A superhydrophobic surface is a physical phenomenon that occurs when a surface is very difficult to dampen. This is due to the coexistence of a chemical property arising from the low surface energy and a physical property of a solid surfaces, resulting in the formation of hierarchical roughness. This review attempts to highlight the superhydrophobic polypropylene coatings, in both terms of how they are prepared and the potential applications they have in various industries. These review also describe the knowledge of various superhydrophobic materials found in nature and the derived wettability theory.

TABLE OF CONTENT

CHAPTER 1

INTRODUCTION

1.1 Background of study

There are numerous superhydrophobic surfaces that can be found in the nature such as plant leaves, insect's legs, and wings. According to *Fihri et al.* (2017), a physical phenomenon known as superhydrophobicity occurs when a surface is extraordinarily difficult to dampen. This is due to the coexistence of a chemical characteristic emerging from a solid's low surface energy and a physical feature resulting from the creation of hierarchical roughness (Kanovsky *et al.*, 2021).

When a water droplet brought into contact with a rough surface, it forms air pockets between the liquid and solid phases, which enhances the hydrophobic effect due to the hydrophobic molecules present in the air and reduces the contact between the droplet and the surface (Kanovsky *et al.*, 2021). Darmanin & Guittard, (2015) stated that materials with superhydrophobic properties are in high demand because of the wide range of potential application. These include anticorrosion coatings, anti-icing coatings, liquid-repellent textiles, oil/water separation, nanoparticle