

SIIC081

COMPARATIVE STUDY ON FABRICATION OF COATED MESH FOR OIL/WATER SEPARATION

Affandy Bin Rahim¹ and Faraziehan Binti Senusi²

¹*Faculty of Chemical Engineering, Universiti Teknologi MARA Pulau Pinang, 13500 Permatang Pauh, Pulau Pinang Malaysia*

²*Faculty of Chemical Engineering, Universiti Teknologi MARA Pulau Pinang, 13500 Permatang Pauh, Pulau Pinang Malaysia*

**Corresponding author: faraziehan@uitm.edu.my*

Abstract:

Oil pollution has become a major global issue that can cause harm to the environment. There are many conventional methods such as oil skimming, dispersant, in situ burning, however, these methods proposed certain drawbacks such as secondary pollution, expensive equipment, and timeconsuming. In response to this problem, super-wetting material is introduced as an alternative. Pristine stainless steel mesh has an amphiphilic characteristic whereby it unable to separate oil/water mixture effectively. The objectives for this study are to determine the effect of different fabrication methods, towards the modification stainless-steel mesh and to evaluate the surface characteristics of superhydrophobic and superoleophilic stainless steel mesh using different characterization methods. In the review process, the main library databases cover most of the papers are Science Direct, Scopus, and Google Scholar. The types of method that have been reviewed in this comparative study are dip/immersion and spray coating method. The characterization involves in this study are surface morphology, surface composition analyses, and surface wettability. In addition, oil/water separation efficiency was conducted by using gravitydriven filtration. In the surface composition analysis, different absorption peaks can be observed due to the different functional groups introduced on coating material. In the surface wettability analysis, it is found that the coated meshes exhibit high water contact angle and low oil contact angle. Other than that, these coated meshes also have high oil/water separation efficiency as superhydrophobic and superoleophilic characteristics are employed.

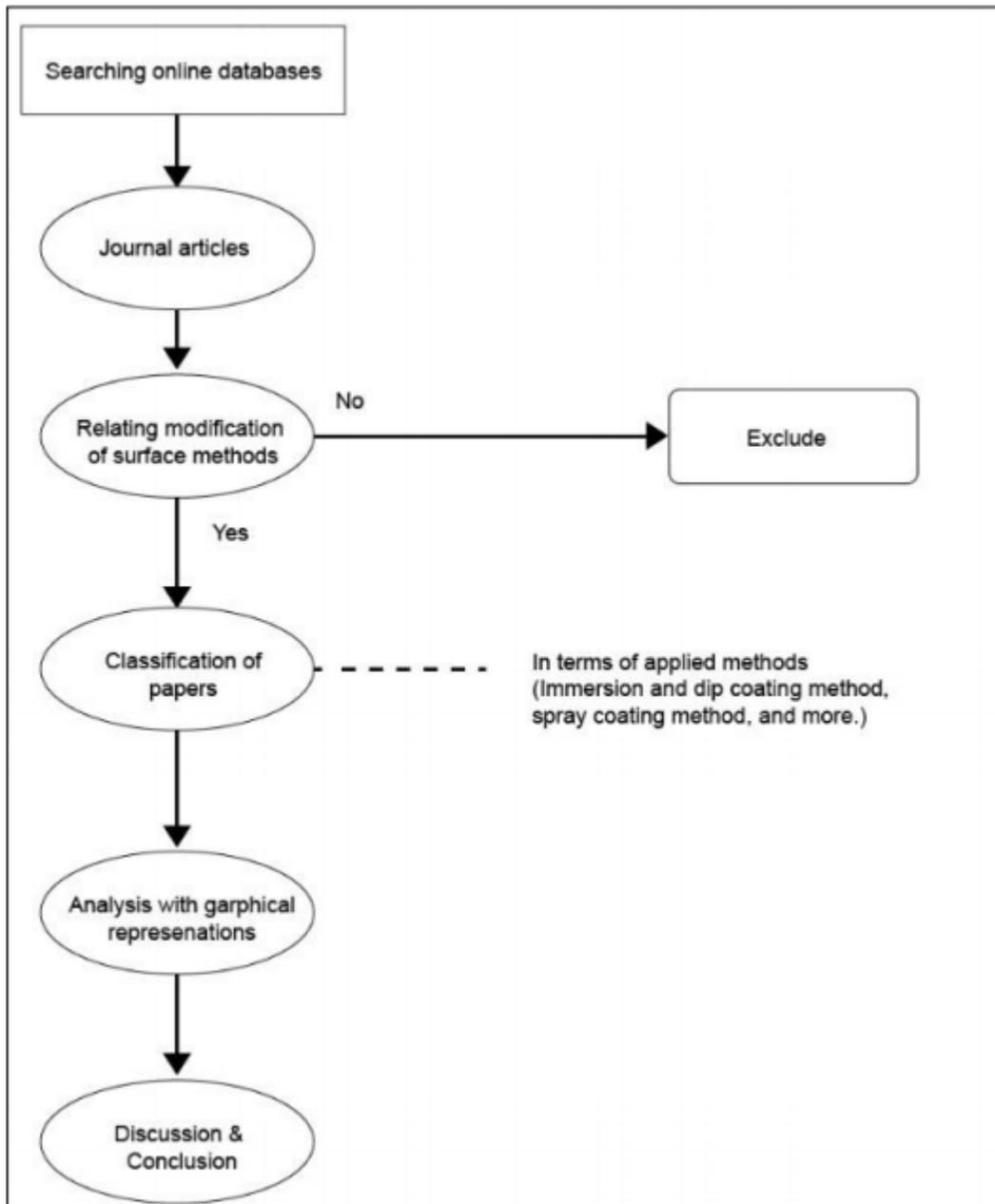
Keywords:

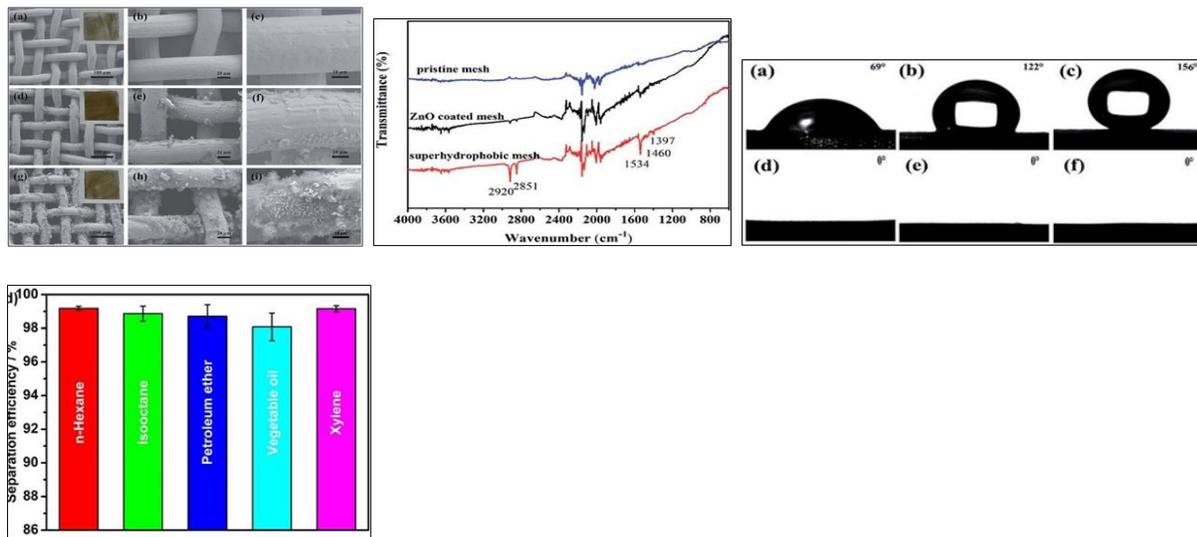
Oil/Water Separation, Superhydrophobic, Superoleophilic, Surface Wettability, Stainless Steel

Objectives:

- To determine the effect of different fabrication methods, towards the modification stainless-steel mesh.
- To evaluate the surface characteristics of super-hydrophobic and superoleophilic stainless steel mesh using different characterization methods.

Methodology:



Results:**Conclusion:**

In summary, robust modified meshes are fabricated by the dip/immersion coating and spray coating of stainless steel mesh. Various materials and chemicals used to modify the pristine stainless steel mesh are highlighted, and the observation of super-hydrophobic, super-oleophilic influences was done. Then, it is obvious that the immersion/dip coating and spray coating process used on stainless steel mesh has an important and distinctive impact on surface morphologies, wettability, composition, and oil-water separation compared to pure stainless steel mesh. Water is filtered on the coated mesh while the oil passes through the coated mesh. These modified materials exhibit hydrophobic and oleophilic characteristics as they filter the water and let oil pass through the surface. In addition, these facile and cost-effective as-prepared stainless steel meshes combined with good mechanical durability and corrosion-resistant properties make them ideal candidates for oil-water mixture applications.