Research

Ts. Dr. Norazlianie produces high-purity hydrogen gas for power industry

Fri, 07/09/2021 - 12:25

GAMBANG, 6 July 2021 - Hydrogen is currently gaining the attention of many countries due to its high efficiency, high energy density and use in the energy industry.

Hydrogen gas is also very easily found in nature, such as from biomass and even water.

According to a senior lecturer and researcher from the College of Engineering, Universiti Malaysia Pahang (UMP), Ts. Dr. Norazlianie Sazali, 32, hydrogen gas has been proposed as one of the long-term solutions to solve the world energy crisis.



“The main focus is selecting the optimal material as the intermediate layer of the carbon membrane to improve or enhance the morphological, thermal and structural characteristics of the membrane to

successfully produce high purity hydrogen gas through the gas separation process.

“The physical structure of the carbon membrane uses supports either tubular or disc to increase the mechanical capability, in addition to making the process more economical.

“The main material of the membrane is a mixture of polyimide/cellulose nanocrystals while the intermediate layer used is from alumina powder,” she said.

From the economic aspect, she said, the production cost could be reduced due to the readiness of polymer precursor and low-cost support materials used, and the fabrication process does not take too long.

“The research titled Modified Polyimide Enrich Carbon Membrane started when I was still a PhD student and successfully completed at the end of 2020.

“At that time, I had studied the optimal conditions for the production of carbon membranes for the same purpose, which is the separation of high purity hydrogen gas.

“The findings reveal that the hydrogen produced has a purity of about 85%,” explained the Johor native.

The research was jointly conducted with her former PhD supervisor, Dr. Wan Norharyati Wan Salleh and Professor Ts. Datuk Dr. Ahmad Fauzi Ismail from Universiti Teknologi Malaysia (UTM) and assisted by Professor Dr. Rizalman Mamat dari College of Engineering, UMP.

She added that the carbon membrane produced for this study has micro-sized pores.

“This membrane will separate the hydrogen molecules from other molecules of different sizes.

“Two important features of this application are the weak interaction between hydrogen with the membrane and certain energy barriers to distinguish hydrogen gas and other gases.

“The ultimate goal of this study is for the purpose of purification of hydrogen gas which plays an important role in the energy industry,” she said.

She further explained that it is very important to produce an optimal and effective carbon membrane to overcome the global energy crisis.

She explained that the existing plans improve the existing carbon membrane and produce a more effective carbon membrane in terms of production cost and duration.

This research project is funded through a Fundamental Research Grant, FRGS-RACER, while the cost of materials has not been detailed because the prototype model is still under discussion.

She said the current plan is to produce a prototype and test the effectiveness of this membrane for gas purification on a larger scale than the laboratory scale.

“A proposal prepared to collaborate with industries related to gas purification,” she said, who has expertise in the field of Gas Engineering.

The research was awarded a silver medal at the Malaysia Technology Expo 2021 and a gold medal at CITREx 2021.

By: Hafizatulazlin Abdul Aziz And Nur Hartini Mohd Hatta, UMP Press

Translation by: Dr. Rozaimi Abu Samah, Engineering College/Faculty of Chemical and Process Engineering Technology

- 226 views

View PDF