RIBOFLAVIN-ASSISTED SYNTHESIS TOWARDS A RENEWALE RICE HUSK SILICA-DERIVED Ni-PHYLLOSILICATE

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This Final Year Project Report entitled "Riboflavin-Assisted Synthesis Towards a Renewable Rice Husk Silica-Derived Ni-Phyllosilicate" was submitted by Asfarina Binti Shudie in partial fulfilment of the requirements for the Degree of Bachelor of Sciences (Hons.) Applied Chemistry, in the Faculty of Applied Sciences, and was approved by

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ABSTRACT

RIBOFLAVIN-ASSISTED SYNTHESIS TOWARDS A RENEWABLE RICE HUSK DERIVED-SILICA Ni-PHYLLOSILICATE

In this work, silica was extracted from rice husk ash (RHA) to prepare Ni-phyllosilicate through sol-gel method at room temperature. Riboflavin was introduced to facilitate the formation of Ni-phyllosilicate. The formation of Ni-phyllosilicate in the presence and absence of riboflavin were confirmed using Fourier Transform Infrared Spectroscopy (FTIR), Scanning Electron Microscope-Energy Dispersive X-ray Spectroscopy (SEM-EDX) and X-ray Diffraction Spectroscopy (XRD). The FTIR spectrum showed that Ni was successfully incorporated into the silica matrix with the presence of Ni-O bending vibration appeared at 685 cm^{-1} in Ni-PS and at 678 cm^{-1} in RB@Ni-PS samples, respectively. However, SEM images showed the surface of Ni-PS was heavily aggregated with layers of small particles, which contributed to the crystallization of layered sodium silicates caused by NiO nanoparticles which have the tendency to aggregate due to their high surface energy and high surface tension of the ultrafine nanoparticles. In comparison in EDX, the Ni content in RB@Ni-PS (2.93 wt. %) was higher compared in Ni-PS (1.98 wt. %). This shows that the riboflavin-assisted Ni-phyllosilicate successful to provide higher nickel content in Ni-phyllosilicate. The presence of layered phyllosilicate-like structure has proven by XRD pattern at diffraction bands around $2\theta = 35^{\circ}$ and $2\theta = 40^{\circ}$ in Ni-PS and RB@Ni-PS. To conclude, the preliminary characterization proves the successful incorporation of riboflavin had increased the formation of phyllosilicate.

TABLE OF CONTENTS