

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

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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-phyllsilicate through sol-gel method at room temperature. Riboflavin was introduced to facilitate the formation of Ni-phyllsilicate. The formation of Ni-phyllsilicate 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  $685\text{ cm}^{-1}$  in Ni-PS and at  $678\text{ cm}^{-1}$  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-phyllsilicate successful to provide higher nickel content in Ni-phyllsilicate. The presence of layered phyllsilicate-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 phyllsilicate.

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