

***Tin Loading onto Silica as a Catalyst and it's
Application for Adsorbent Surface of Methylene
Blue and Brilliant blue Dye in Aqueous Solutions***

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the Master Degree of Science in Chemistry.

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Abstract

Rice husk ash (RHA) was converted to sodium silicate by using one molar of sodium hydroxide. The formed silicate was treated with 3-(chloropropyl)triethoxysilane (CPTES) and tin chloride (SnCl_2) to form a solid product.

The template was removed from the product by calcination ions at $500\text{ }^\circ\text{C}$ and give solid tin onto silica (labeled as RHASn). The tetragonal structure of SnO_2 confirms by XRD patterns onto the silica surface. A reduced carbon percentage with the presence of Sn onto silica after calcination was deducted by elemental analysis. FT-IR recorded a vibration of Si-O-Sn; while UV-VIS-DR spectrum reflects that the Sn species in an octahedral environment or hexacoordinated polymeric Sn-O-Sn type species could be formed. RHASn had $87.34\text{ m}^2\text{ g}^{-1}$ as a specific surface area and the pore size ranged between 2-5 nm falls in the microporous range. The RHASn prepared was applied as an adsorbent to remove the brilliant blue (BB) and methylene blue (MB) dyes from aqueous solutions. Box-Behnken design (BBD) was used to investigate the significant variables that directly correlate with the BB and MB dyes removal i.e. RHASn dose, initial pH, temperature, and time. The obtained results showed a high removal percentage for BB and MB dyes, reached up 97.2 % and 98.1 %, respectively. This work reflects the ability of RHASn to be an effective adsorbent in treating wastewater containing organic dyes.