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Hydrogen Sulfide Removal Using CeO₂/NaOH/PSAC: Effect of Preparation Parameters

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Abstract

Combining adsorptive activated carbon and catalytic oxidative cerium oxide, an adsorptive catalyst could be synthesized. Cerium oxide impregnated on activated carbon had been utilized in various gas pollutant removal technologies. In this study, impregnation of cerium oxide and sodium hydroxide on palm shell activated carbon (PSAC) was attempted to produce an adsorbent for H₂S removal from biogas produced in palm oil industry. Effects of preparation parameters of CeO₂/NaOH/PSAC towards H₂S removal were successfully studied. The studied parameters were impregnation time, cerium amount, NaOH concentration, calcination temperature and calcination time. From the study, it was found that every parameter can be optimized because there was a value of the parameter that resulted in a maximum adsorption capacity. The optimum preparation parameters of CeO₂/NaOH/PSAC were found to be 1.5h impregnation time, 5% cerium, 1.0M NaOH, 400°C calcination temperature and 3h calcination time. Selected adsorbents were characterized in order to further understand adsorbent properties and characteristics of the reaction.

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