Title: Hydrogen Sulfide Removal Using CeO_2/NaOH/PSAC: Effect of Preparation Parameters

Authors: Lee Chung Lau, Norhusna Mohamad Nor, Keat Teong Lee, Abdul Rahman Mohamed

PII: S2213-3437(17)30658-9
DOI: https://doi.org/10.1016/j.jece.2017.12.019
Reference: JECE 2066

To appear in:

Received date: 30-8-2017
Revised date: 25-11-2017
Accepted date: 12-12-2017

Please cite this article as: Lee Chung Lau, Norhusna Mohamad Nor, Keat Teong Lee, Abdul Rahman Mohamed, Hydrogen Sulfide Removal Using CeO2/NaOH/PSAC: Effect of Preparation Parameters, Journal of Environmental Chemical Engineering https://doi.org/10.1016/j.jece.2017.12.019

Hydrogen Sulfide Removal Using CeO_2/NaOH/PSAC: Effect of Preparation Parameters

Lee Chung Lau[1*], Norhusna Mohamad Nor[2], Keat Teong Lee[2], Abdul Rahman Mohamed[2]

*Corresponding author. Tel.: +605-4688888; Fax: +6054667449

E-mail address: laulc@utar.edu.my

[1]Department of Petrochemical Engineering, Faculty of Engineering and Green Technology, Perak Campus, Universiti Tunku Abdul Rahman, Jalan Universiti, Bandar Barat, 31900 Kampar, Perak, Malaysia.

[2]School of Chemical Engineering, Universiti Sains Malaysia, Engineering Campus, Seri Ampangan, 14300 Nibong Tebal, Pulau Pinang, Malaysia.

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 H_2S removal from biogas produced in palm oil industry. Effects of preparation parameters of CeO_2/NaOH/PSAC towards H_2S 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 CeO_2/NaOH/PSAC were found to be 1.5h impregnation time, 5% cerium, 1.0M NaOH, 400^oC calcination temperature and 3h calcination time. Selected adsorbents were characterized in order to further understand adsorbent properties and characteristics of the reaction.