

# CO<sub>2</sub> Adsorption Using 3-Triethoxysilylpropylamine (APTES)-Modified Commercial Rice Husk Activated Carbon

*Muhammad Zubair Abdul Wahab Saaroni, Hamidah Abdullah<sup>a</sup>, Emyra Ezzaty Masiren, Md. Maksudur Rahman Khan*

Faculty of Chemical and Natural Resources Engineering, Universiti Malaysia Pahang,  
26300, Kuantan, Pahang, Malaysia  
[hamidah@ump.edu.my](mailto:hamidah@ump.edu.my)

## **Abstract.**

Carbon dioxide (CO<sub>2</sub>) is one of the greenhouse gases that causes global warming. Therefore, there is a need for CO<sub>2</sub> capture technologies in order to reduce the CO<sub>2</sub> emissions to the atmosphere. In this study, commercial rice husk activated carbon was impregnated with 3-triethoxysilylpropylamine (APTES) to investigate the efficiency of modified activated carbon for CO<sub>2</sub> adsorption. The modification parameters, such as the APTES concentration (2-5 wt%) and type of solvent (water and ethanol) were also investigated. Then, the modified activated carbon was characterized by nitrogen adsorption-desorption, scanning electron microscopy and Fourier transform infrared spectroscopy. The maximum CO<sub>2</sub> adsorption capacity was 7602 mg/g for APTES-AC with 5 wt % APTES using ethanol as solvent. This study shows that the rice husk activated carbon modified with APTES could enhance the CO<sub>2</sub> adsorption performance due to the physisorption and chemisorption

**Keyword:** Adsorption; CO<sub>2</sub>; APTES-modified rice husk activated carbon