

Regeneration and characterization of spent bleaching clay.

ABSTRACT

Spent bleaching clay (SBC), a solid waste generated from the palm oil refinery, may be recycled rather than being simply disposed off in landfills. The aim of this research was to investigate the heat regeneration of SBC and to evaluate the performance of the heat-treated SBC in bleaching crude oil. Two types of SBC were used, i.e. (a) acid-activated clay, and (b) natural clay. Two types of regeneration processes were performed, i.e. (a) solvent extraction followed by heat treatment, and (b) direct heat treatment. Heat treatment was conducted in a box furnace at temperatures ranging from 400°C to 800°C. Red colour indices of oils were used to determine the regeneration efficiency. Spent bleaching clay produced by the direct heated-regenerated spent bleaching clay (HRSBC) yielded a higher regeneration efficiency than the deoiled-heated-regenerated spent bleaching clay (DHRSBC) produced by solvent extraction and heat treatment. This is because moisture, impurities and dirt were more completely removed by direct heating than by solvent extraction. Specific surface area, total pore volume and average pore size of SBC were measured using the nitrogen adsorption-desorption method. The results show that the HRSBC at 500°C possessed a higher specific surface area and total pore volume and gave a better bleaching efficiency than HRSBC at 400°C and 800°C. All the regenerated SBC samples were mesoporous material.

Keyword: Spent bleaching clay; Adsorbent; Regeneration; Physical properties