

SYNTHESIS OF MESOPOROUS SILICA AND ZEOLITE PHASE TRANSFORMATION OF COAL FLY ASH FROM KAPAR POWER PLANT

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ABSTRACT

Coal fly ash (CFA) was sintered with and without alkali additives. Supernatant of these sintered CFA were used in the synthesis of zeolites and mesoporous silica MCM41. Faujasite phase was mixed with sodium silicate phase in samples sintered with alkali additives from x-ray diffraction analyses. Mesoporous materials MCM-41 with pores of ordered 2-dimensional (2d) hexagonal structure were successfully prepared from condensation-polymerization of quaternary ammonium salt as structure directing agent and supernatant of the CFA sintered with alkali additives from Kapar power plant as silica precursor. The materials had high surface area of 732 m²/g and median pore diameter of 2.5 nm by density functional theory method (DFT). X-ray diffraction analyses revealed that alkali additives are important in extracting silica from quartz and mullite.

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