EFFECT OF ALKALI CONCENTRATION ON THE SYNTHESIS OF Na-X ZEOLITE FROM LAKHRA COAL POWER PLANT FLY ASH

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Abstract

Combustion of coal in power plants generates substantial amount of fly ash, which can be a potential source of environmental pollution particularly in developing countries, given its improper disposal and insufficient further utilization there.

The purpose of this research is to study viable recycling of fly ash to optimize its application to deal with the abundance of the material. Effect of alkali concentration on the synthesis of Na-X zeolite from Lakhra coal power plant fly ash (CFA) was studied using three different ratios of NaOH:CFA i.e. 1.0, 1.3 and 1.6 via fusion method. Chemical composition of CFA was determined via XRF, while mineralogy and morphology of both CFA and that of synthesized Na-X zeolite was studied by XRD and SEM. The synthesized product during the course of its fusion was identified as pure Na-Faujasite. Major crystalline phases present in CFA were those of quartz and hematite. The results showed that the zeolite particle size had higher size range of 43.5 and 47.2 µm with the ratio of 1 and 1.6 as compared to lower particle size of 36.7 µm with the optimum ratio of 1.3. Maximum surface area of 4545 cm²/cm³ was also obtained with the ratio of 1.3. It was concluded that the optimum product having high crystallinity with suitable particle size and maximum surface area was synthesized with NaOH:CFA ratio of 1.3.

Keywords: Coal fly ash, Alkali ratio, Na-X zeolite, Particle size, Surface area

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