

# Conversion of Coal Fly Ash into Soil Conditioner by Alkaline Hydrothermal Treatment

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## ABSTRACT

Natural zeolites - mainly calcic - have been used worldwide as soil conditioner. In Brazil, and especially in the state of Rio Grande do Sul, natural zeolites are only geological curiosities which can embellish mineral collections around the world, since the occurrences are set on the walls of geodes and vugs of basalts, due to hydrothermal deposition.

Zeolites can be synthesized from coal fly ashes, by hydrothermal treatment, in a alkaline medium, mainly NaOH, also KOH, but never Ca(OH)<sub>2</sub>. Since Rio Grande do Sul is responsible over 50% of Brazil's thermal power generation by coal combustion, producing annually more than 1.7 millions ton of coal fly ashes, this route to obtain zeolites was tested. Experiments of alkaline hydrothermal activation of fly ashes from Rio Grande do Sul coals, for application in soil, were performed using a 3.5M KOH solution, in a open system, at temperature of 100°C, reaction time up to 7 days, and ratio of activation solution to fly ash of 10. Potassic chabazite or a mixture of potassic chabazite and potassic phillipsite (PDF 12-0194 and 30-0902), was obtained.