

# Potential Use of Surfactant Modified Zeolite to Treat Leachate from Fly Ash Disposal Sites

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## **ABSTRACT**

Large volumes of fly ash and other coal combustion products (CCPs) are produced every year by coal-fired power plants. About 50% of the CCPs produced in the U.S. is buried in impoundment lagoons or dry landfills. Fly ash is generally enriched in several potentially hazardous trace elements, such as As, B, Cd, Co, Cr, Mo, Se, Sr, and V, which can leach from older, unlined disposal sites. Therefore, effective remediation of older CCPs disposal sites is needed to minimize any potential impact of leachate on the groundwater system.

Fly ash samples collected from four power plants were used in this study. For each ash sample, leachate was produced by shaking 30 g of ash in 450 ml of DDI water for 48 hours. The generated leachate solutions were separated from the ash and treated with surfactant modified zeolite (SMZ). HDTMA-Br modified clinoptilolite was used at different percentages (1% to 20% of 2.67 g of ash) to treat 40 ml of ash leachate. Quantitative comparison of the elemental composition of SMZ-treated and untreated leachate indicated that SMZ is effective in decreasing the concentration of oxyanion and cationic trace elements associated with coal fly ash. In general, up to 30% of the As, Mo, and V; up to 80% of the Cr; and up to 20% of the Se and Sr were removed from the leachate after SMZ treatment. These results support potential use of SMZ in permeable reactive barriers to control the dispersion of heavy metals and metalloids from ash disposal sites.

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