**Development of microporous activated Aloji clay for adsorption of lead (II) ions from aqueous solution**

**Abstract**

Aloji clay was activated with HCl at optimal conditions variables (acid concentration, [activation temperature](https://www.sciencedirect.com/topics/mathematics/activation-temperature) and time) using [central composite design](https://www.sciencedirect.com/topics/engineering/central-composite-design) with yield (%) and Pb2+ uptake as responses targeted. The obtained optimum conditions for high yield (%) and Pb2+ uptake were at 0.5 M, 100 °C and 120 min. At these conditions, BET surface area of 214.80 m2/g of the [microporous](https://www.sciencedirect.com/topics/chemistry/micro-porosity" \o "Learn more about microporous from ScienceDirect's AI-generated Topic Pages) activated adsorbent gave a maximum monolayer of 333.33 mg/g for Pb2+. The effects of equilibrium time, initial Pb2+ concentration, temperature and adsorbent dosage were examined. Pseudo-second-order kinetic and Freundlich models best described Pb2+ adsorption onto Aloji activated clay as compared to the other [isotherms](https://www.sciencedirect.com/topics/mathematics/isotherms) and [kinetics models](https://www.sciencedirect.com/topics/engineering/kinetic-model) investigated. The adsorption process was spontaneous, exothermic and physical as revealed by the nature of the thermodynamic studies. The study shows that the discharge of harmful substances posed by industrials into water bodies can be salvage by effective and efficient use of activated Aloji clay.