**Abstract**

This study utilized Aloji clay modification for Pb(II) adsorption from an aqueous solution via batch adsorption process. The clays were characterized by X-ray fluorescence, X-ray diffraction, Fourier transform infrared spectroscopy, scanning electron microscopy and Brunauer–Emmett–Teller (BET). The raw clay and acid-activated clay have BET surface areas of 138.7 and 172.0 m2 /g, respectively. The adsorption parameters: adsorbent time, dosage, temperature, pH, and initial concentration were all investigated. Out of the three isotherm models investigated, the Freundlich model gave the best fit to the experimental data. The result of kinetic and thermodynamic studies revealed that the adsorption process obeyed pseudo-second-order, spontaneous, endothermic, and physical progression. The adsorption of Pb(II) onto activated Aloji clay, when compared with other natural adsorbents from literature, gave the highest monolayer adsorption capacity.