In this work, a layered silicate magadiite-Na (Mag) is hydrothermally synthesized and used to prepare organic thiourea-intercalated magadiite. It is organically modified by N-(2-methoxyphenyl)-N´-(2-methylphenyl)-thiourea (TMMe) and N-(2-methoxyphenyl)-N´-(2-methoxyphenyl)-thiourea (TMM) without preintercalation with a cationic surfactant. These materials are characterized by X-ray diffraction, infrared spectroscopy, and scanning electron microscopy. Due to the increment of basic centers attached to the pendant chains, the metal adsorption capacities of the final chelating materials are found to be higher than the precursor. The ability of these materials to remove Pb(II) from an aqueous solution is followed by a series of adsorption isotherms at a temperature of 25°C, pH 5 and pH 7. The kinetic parameters analyzed by the Lagergren and Ho and Mc Kay models give a good fit for a pseudo-second-order reaction for all systems. The adsorption isotherm data follow the Langmuir equation where parameters are calculated. Mag/TMM has a better lead(II) removal capacity (33.44 mg/g) at pH 5 than Mag/TMMe (19.9 mg/g) and Mag (9.91 mg/g) at pH 7.

Keywords: Na-magadiite; Hydrothermal synthesis; Intercalation; Thiourea derivatives; Lead; Adsorption