Abstract

Water pollution by rare earths (lanthanum) is an alarming problem in recent years, it effects human health and the environment .the aim of this work is use raw and modified supports to clean water containing lanthanum (III) and to determine the parameters that can improve it .Removal by sorption is experimented with using active charcoal, montmorillonite K10 and thermally exfoliated vermiculite .kinetic studies of equilibrium and ionic and thermodynamic exchanges are carried out for the three adsorbents used. The results obtained show that the elimination of lanthanum by vermiculite is more effective than that obtained by montmorillonite K 10 and active charcoal. The retention mechanism of lanthanum ions on clays can be due to two different phenomena: exchange with interfoliar cations or adsorption and formation of complexes at the edge of the sheets. The follow of protons and NO_3^-, Ca^{2+} et K^+ ions during the lanthanum sorption process on the two used clays showed that sorption takes place by cation exchange at the law concentrations and by complex sorption $[La(NO_3)]^{2+}$ or $[La(NO_3)_2]^+$at high concentrations .The grinding of vermiculite led to an increase in the maximum quantity of lanthanum adsorbed. The adsorption of lanthanum is also studied at different sizes of vermiculite grains. The results of the tests show that the efficiency of vermiculite in the adsorption of ions $[La^{3+}]$ increases with decreasing of particles size. The effect of temperature of the reaction medium on the quantity of lanthanum adsorbed on montmorillonite K10 is not regular, the adsorbed quantity of lanthanum decrease with temperature in the range 11 - 25°C and a slight increase was noticed in the range 50 - 110°C.

Keywords : lanthanum $[La^{3+}]$; sorption; ion exchange; active charcoal; thermic exfoliation vermiculite; montmorillonite.