623/E2

Effect of Experimental Parameters on Brick Particle - Cr(VI) Interaction

Namal Priyantha and Anushka Bandaranayaka*
Department of Chemistry, University of Peradeniya, Peradeniya

Among many naturally available substances, brick particles show a significantly high removal of metal ions through processes means such as adsorption, absorption and ion-exchange, and consequently, the microscopic picture of the interaction of a metal ion with brick particles is a complex issue. The mechanism of the interaction of metal ions with brick particles, and hence the extent of adsorption, depends on environmental conditions. Consequently, pre-treatment and chemical modification methods could be employed to enhance the efficiency of the metal ion removal process for which laboratory scale experiments by changing conditions such as temperature of firing raw clay, interference effects, ionic strength variations would be important. Findings of such investigations would be valuable in designing models for the brick particle – metal ion interaction.

The temperature of firing for the maximum removal of Cr(VI) is found to be 200 °C, at which more than 50 % removal is possible under experimental conditions. Treatment of brick clay particles fired at 200 °C with HCl acid solutions of different strengths indicates that the chemical modification of active sites of brick surfaces would probably enhance the strength of interaction toward Cr(VI) species. However, highly concentrated acid solutions would probably alter the surface chemistry of brick leading to lower attraction ability. Further change in the ionic strength of the medium does not show any significant influence suggesting that the Cr(VI)-brick particle interactions lead to the formation of an inner-sphere complex. This is further supported by having the extent of Cr(VI) removal unchanged to a solution pH of about 11.