Adsorption of selected heavy metals onto clay and sand: Analysis and interpretation using two different adsorption isotherm models

ABSTRACT

Analysis and interpretation of adsorption isotherms on adsorption from solution provides important information related to adsorption properties such as amount of adsorption capacity, mechanism of adsorption pathway and affinity constants. This information enables the prediction and assessment of the performance of the involved adsorption process and is practical for optimizing the use of the absorbent in the intended application. Therefore, in this paper a study on the adsorption of selected heavy metals onto clay and sand was conducted. The study involved the measurement of excess adsorption isotherm using conventional liquid phase adsorption technique. The obtained experimental data was interpreted by analyzing the excess adsorption isotherm with Langmuir isotherm based on pseudo ideal monolayer adsorption model and directly interpreted from excess adsorption isotherm model. Result showed that the value of adsorption capacities based on pseudo ideal monolayer adsorption model are smaller than obtained from directly interpreted from excess adsorption isotherm model due to different adsorption assumptions in both models. However, the sequence of adsorption capacity for both models in adsorption of selected heavy metals onto the clay and sand showed the same pattern with $Pb^{2+} > Cu^{2+} > Zn^{2+}$.