عنوان مقاله:
Presenting the new adsorption isotherm model

محل انتشار:
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خلاصه مقاله:
Isotherm models of adsorption, such as Langmuir model, have been used to describe the adsorption processes during last centuries. The main disadvantage of these models is their disability to calculate initial adsorption. Although these models use concentration at equilibrium (CReR) as an independent variable, they are dependent on the adsorbent capacity. In this study, a review of present isotherm models and their issues are investigated, and a new model is presented according to the law of mass conservation. In present work, Iranian zeolite was used to remove the cadmium ion from water and evaluate our new model. In this new model that is based on Langmuir model, some modifications were made to correct some fundamentals neglected in previous models. To prove this model, adsorption of cadmium on Iranian zeolite is fitted to the model. Based on this model, 20% of total adsorption can be presented as initial adsorption. Meanwhile, by considering equilibrium adsorption (qReR) as a function of initial concentration, not only the precision of the model will be enhanced, but also equilibrium capacity of adsorption increased to 14%. Therefore,adsorption capacity of cadmium in the new model is 34% more than Langmuir. Moreover, maximum adsorption efficiency reaches to 100% in 5 mg/L concentration of cadmium which verifies the initial concentration concept in the new adsorption model.

کلمات کلیدی:
Isotherm models, new model theory, initial adsorption, zeolite, cadmium