



Phosphate adsorption on biogenetic calcium carbonate minerals: effect of a crystalline phase

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ABSTRACT

The shells of *Argopecten irradians* (SAI) and *Macrta veneriformis* (SMW) were used as adsorbents to remove the phosphate from an aqueous solution in the present study. The removal kinetics and adsorption isotherms were investigated, and the phosphate adsorption behaviors by these two shells were also explored and discussed. The results indicated that the kinetic of an adsorption process follows the Lageren pseudo-first-order equation and the adsorption isotherm accords well with both the Langmuir and Freundlich adsorption equations, while the former is more suitable. Based on the Langmuir model, the monolayer saturated adsorption quantities of SAI and SWM at 25°C are 3.07 and 3.32 mmol/g, respectively. The phosphate adsorption on these shells is endothermic in nature and the adsorption capacities of such shells increase with temperature. In addition, biogenic calcium carbonate with a calcite phase shows more capacity on phosphate adsorption than the one with an aragonite phase.

Keywords: Calcite; Shells; Phosphate; Adsorption

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