
# Modeling competitive sorption of lead and copper ions onto alginate and greenly prepared algal-based beads

Shengye Wang, Thierry Vincent, Catherine Faur, Eric Guibal

PII: S0960-8524(17)30103-7
DOI: http://dx.doi.org/10.1016/j.biortech.2017.01.066
Reference: BITE 17561

To appear in: *Bioresource Technology*

Received Date: 4 January 2017
Revised Date: 30 January 2017
Accepted Date: 31 January 2017

Please cite this article as: Wang, S., Vincent, T., Faur, C., Guibal, E., Modeling competitive sorption of lead and copper ions onto alginate and greenly prepared algal-based beads, *Bioresource Technology* (2017), doi: http://dx.doi.org/10.1016/j.biortech.2017.01.066

# Modeling competitive sorption of lead and copper ions onto alginate and greenly prepared algal-based beads

Shengye Wang,[1] Thierry Vincent,[1] Catherine Faur,[2] and Eric Guibal[1*]

1. Ecole des mines d'Alès, Centre des Matériaux des Mines d'Alès (C2MA), Pôle Matériaux Polymères Avancés (MPA) 6, Avenue de Clavières, F-30319 Alès cedex, France;

2. Institut Européen des Membranes-IEM (UMR 5635 CNRS-ENSCM-UM2)-Equipe Génie des Procédés Membranaires, Université Montpellier cc047, Place Eugene Bataillon, 34095 Montpellier Cedex 5, France;

*Correspondence: eric.guibal@mines-ales.fr; Tel.: +33 (0)466782734

## Abstract

The binary sorption of Pb(II) and Cu(II) onto calcium alginate, algal biomass and algal/glutaraldehyde-crosslinked polyethyleneimine (PEI) composite beads was studied in the absence and presence of Ca(II). Different competitive models were compared for predicting the equilibrium data. Results show that all the sorbents have a significant preference for Pb(II) over Cu(II) in Pb-Cu system: the separation factors reach 14.1, 9.1 and 3.6 for alginate, algal biomass and algal/PEI beads, respectively. Kinetic studies confirm the occurrence of an ion-exchange mechanism between Pb(II) and Cu(II) as the sorption sites are progressively saturated. Competitive Sips model predicts well the sorption data for all the sorbents. In Pb-Cu-Ca system, the Cu(II) sorption by algal beads was negligible, while algal/PEI still maintained a significant sorption of Cu(II) sorption under these conditions.

**Keywords:** Heavy metal; Binary sorption; Alginate; Algal biomass; Modeling.

Emails: shengye.wang@mines-ales.fr (S.W.), thierry.vincent@mines-ales.fr (T.V.), catherine.faur@univ-montp2.fr (C.F.), eric.guibal@mines-ales.fr (E.G.)