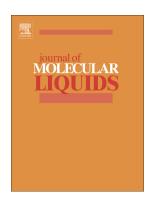
### Accepted Manuscript

Comparative study of modified expanded perlite with hexadecyltrimethylammonium-bromide and gallic acid for boron adsorption



Pelin Demircivi, Gulhayat Nasun Saygili

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## **ACCEPTED MANUSCRIPT**

## Comparative study of modified expanded perlite with hexadecyltrimethylammonium-bromide and gallic acid for boron adsorption

Pelin Demircivi<sup>a\*</sup>, Gulhayat Nasun Saygili<sup>b</sup>

<sup>a\*</sup>Yalova University, Chemical and Process Engineering Department, Yalova, Turkey Tel: +902268155409; Fax: +902268155401; e-mail: pelindemircivi@gmail.com <sup>b</sup>Istanbul Technical University, Chemical Engineering Department, Istanbul, Turkey

#### ABSTRACT

Expanded pelite-based novel adsorbents for boron adsorption were evaluated by the modification with hexadecyltrimethylammonium bromide (HDTMA) and gallic acid (GA). The samples were characterized by XRD, SEM and FTIR analysis. The adsorption of boron was examined at different HDTMA/GA concentrations, solution pH, initial concentration, temperature and contact time. Inert electrolyte effect on boron adsorption was also investigated. The optimum pH was found between pH 7-9. At the optimum pH level, boron adsorption capacities of HDTMA-perlite and GA-perlite were calculated as 833 mg/g and 2500 mg/g, respectively. The adsorption kinetic data was best described by pseudo second-order kinetic model for both HDTMA-pelite and GA-perlite samples. The adsorption process was found to be endothermic, and positive entropy values the increase of randomness at solid/liquid interface.

Keywords: Boron, Batch adsorption, HDTMA, Gallic acid, Perlite

#### **1. Introduction**

Although, boron exists naturally in environment, it is also released to environment by industrial discharge. Boron mines and boric acid plants are the main sources for the boron pollution [1]. Besides, boric acid and boron salts have widely used in the

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