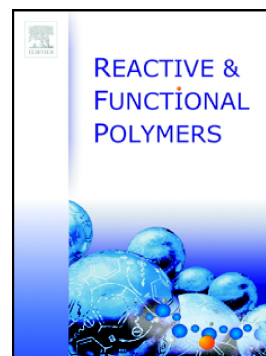


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Dual Ionic Cross-linked Alginate/Clinoptilolite Composite Microbeads with Improved Stability and Enhanced Sorption Properties for Methylene Blue

*Maria Valentina Dinu**, *Maria Marinela Lazar*, and *Ecaterina Stela Dragan*

“Petru Poni” Institute of Macromolecular Chemistry, Department of Functional Polymers,
Grigore Ghica Voda Alley 41A, Iasi 700487, Romania

Corresponding Author

*E-mail: vdinu@icmpp.ro Fax: +40 232 211299. Tel: +40 232 217454.

ABSTRACT

Environmentally friendly and low-cost composites based on sodium alginate and clinoptilolite (Alg/CPL) were prepared as microbeads and were used as sorbents for removal of methylene blue (MB) from simulated wastewaters. A combination of various characterization techniques pointed out that CPL could also act as ionic cross-linker for Alg chains through the Ca^{2+} ions adsorbed on its surface, and consequently, leading to dual ionic cross-linked Alg/CPL composites with improved chemical stability. The composite microbeads containing a 1:5 weight ratio between Alg and CPL (Alg_1CPL_5) showed an enhanced sorption capacity for MB (q_m : 452.25 mg g^{-1}) compared to Alg microbeads (q_m : 151.73 mg g^{-1}) and CPL (q_m : 48.12 mg g^{-1}). Chemisorption was considered the main mechanism governing the MB sorption process as indicated by the better fitting of pseudo-second order equation on the kinetic data. The desorption studies confirmed further the mechanism of dye sorption and showed the possible

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