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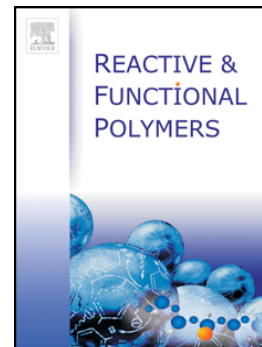
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Synthesis and Characterization of 2-hydroxyethyl methacrylate-ethylene glycol dimethacrylate Polymeric Granules Intended for Selective Removal of Uric Acid

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ABSTRACT

Suspension polymerization was used in the synthesis of new uric acid-imprinted porous adsorbents based on 2-hydroxyethyl methacrylate and ethylene glycol dimethacrylate in the shape of granules. Physico-chemical and adsorption properties of the synthesized adsorbents were studied as well as those of the reference adsorbent (i.e. synthesized in the absence of uric acid). The obtained polymer granules were studied by scanning electron microscopy. Systematic studies of equilibrium and dynamics of uric acid adsorption from aqueous solutions were performed at various temperatures (298 K, 310 K and 318 K). It was established that the amount of introduced template exerts an influence on structural features and sorptive capacity of the synthesized polymers. Molecularly imprinted polymers (MIPs) are capable of extracting uric acid from aqueous solutions with higher sorptive capacity than the reference polymer at various temperatures (298 K, 310 K and 318 K). The uric acid adsorption by the reference polymer (NIP-10) is in good agreement with the Langmuir model, while the uric acid adsorption by imprinted polymers can be better described by the Freundlich model. The MIP-40-10 polymer is capable of adsorbing uric acid with the highest sorptive capacity at three temperatures; the value of imprinting factor is also the highest (IF=4.3, 298K). The studies of adsorption thermodynamics demonstrated that the adsorption process is exothermic in nature.

Keywords: *suspension polymerization, molecular imprinting, insoluble template, uric acid.*

1. Introduction

Uric acid (UA) is the main end product of purine metabolism and can serve as one of the key biomarkers in diagnostics of a number of diseases (e.g., gout, hyperuricemia, chronic renal disease etc. [1]) The UA level in serum exceeding 420 $\mu\text{mol/L}$ is a risk factor for hyperuricemia, gout and chronic renal disease. Moreover, there is a direct correlation between hyperuricemia in patients and development of arterial hypertension, metabolic syndrome, chronic heart disease [2-4]. The data of epidemiological studies indicate continuous actual growth in gout morbidity due to various causes (including enhancement diagnostics [5]). In this connection, development of polymer sorbents for efferent therapy which allow significant increase in elimination of UA salts

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