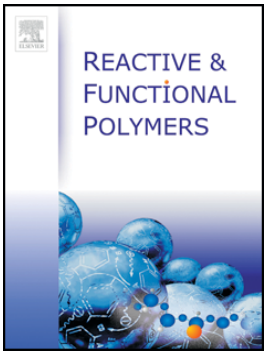

Functionalization of 2-hydroxyethyl methacrylate-based polyHIPEs: Effect of the leaving group

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Functionalization of 2-Hydroxyethyl Methacrylate-Based PolyHIPEs: Effect of the Leaving Group

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Abstract

Highly porous polymers based on 2-hydroxyethyl methacrylate (HEMA) have been successfully prepared through the high internal phase oil-in-water emulsions and further functionalized. Since functionalization of alcohol containing polymers through the direct nucleophilic substitution is rather difficult due to poor leaving ability of hydroxyl groups, the HEMA-based polymers have been modified through the halodehydroxylation and tosylation in order to obtain better leaving group residues as compared to the hydroxyl one. Conversion of hydroxyl groups into the corresponding alkyl halides and tosylates were found to be 78, 50, and 36 % for the HEMA-Cl, HEMA-Br and HEMA-Ts, respectively. Further functionalization with the piperazine and tris(2-aminoethyl)amine through amine-alkylation was performed to test the leaving group ability of previously modified HEMA-Cl, HEMA-Br and HEMA-Ts polymers. Lower conversion rates for the HEMA-Cl or the HEMA-Br (between 18 to 41 %) were found as compared to the HEMA-Ts (between 46 to 89 %).

Keywords: polyHIPEs, solid phase organic synthesis, functional polymers, polyHEMA, halodehydroxylation