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Complexing porous polymer monoliths for online solid-phase extraction of metals in sequential injection analysis with electrochemical detection

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ABSTRACT

A monolithic column affording complexing groups was synthesized for automated solid-phase extraction of potentially toxic metal ions in a low-pressure sequential injection analyzer. Poly(glycidyl methacrylate-co-ethylene dimethacrylate) monoliths were synthesized by free-radical polymerization in the coffins of fused silica-lined stainless-steel tubes (2.10 mm i.d. × 5–6 cm length). High permeability (4.33×10^{-13} m^2) was achieved for monoliths polymerized for 24 h at 60 °C from a mixture of 30 wt % glycidyl methacrylate, 10 wt % ethylene glycol dimethacrylate, 35 wt % n-propanol, 20 wt % 1,4 butanediol and 5 wt % water. Azobisisobutyronitrile (1 wt % with respect to the monomers) initiated the free-radical polymerization. These generic columns were modified with iminodiacetate to create complexing functionalities on the polymer surface, being further used for online solid-phase extraction of Cu^{2+}, Pb^{2+} and Cd^{2+} from natural, tap and drinking waters prior to their determination by stripping chronopotentiometry. The high permeability of the column allowed the loading,