Monolith Polymerization as an effective strategy to develop sorbents for solid state extraction.

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Abstract: Polymeric sorbents with balanced hydrophilic and hydrophobic properties are very useful and in high demand in the field of separation science due to their potential for extracting polar as well as nonpolar analytes. Our aim is to develop polymeric sorbents for effective and efficient extraction of polar analytes in aqueous samples. Our approach is to adopt the monolith polymerization method to co-polymerize divinylbenzene (DVB) (a hydrophobic crosslinking monomer) and *N*-vinylpyrrolidone (NVP) (a hydrophilic monomer). This strategy was found to be preferable over the common suspension polymerization approach in that polymer monoliths can be conveniently prepared without sophisticated set-up, tuned to have varying ratio of hydrophilic/hydrophobic components, and easily reproduced with high fidelity. Polymer monoliths with different percentages of NVP content were made, and their absorption efficiencies were assessed by batch binding studies of a highly polar (log K_{ow} = -0.6.) caffeine (1,3,7-trimethylxanthine) in water. Co-polymers with 30% NVP had superior performance, extracting about 90% of analyte from a 0.16 mM caffeine solution.