

Abstract

# Polymeric Hydrogels for the Removal of Emerging Contaminants from Water <sup>†</sup>

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**Abstract:** Herein, a proof of concept is reported, concerning the formulation of methacrylic and styrene-based hydrogels with adsorption properties versus the emerging pollutants (dyes, pesticides, and pharmaceuticals). The synthesis of the hydrogels was achieved by functionalizing the HEMA monomer with specifically chelating groups, such as amino acids (lysine and histidine), cyclodextrins, and meglumine. The as-prepared monomers were polymerized in water at different temperatures to obtain macroporous samples. All the samples were characterized by chemical–physical and morphological analyses confirming the success of the reactions. The resulting systems were successfully tested to adsorb 2, 4 D, methylene blue, and lomefloxacin. In addition, up to five cycles of regeneration tests were performed, confirming the aptitude of the samples to be used several times without losing efficiency and maintaining their mechanical properties.

**Keywords:** wastewater; purification; hydrogel; photocatalysis; emerging contaminants



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