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Eco-friendly synthesis of a biodegradable nanocomposite hydrogel containing mesoporous nanosilica based on cellulose in removal of heavy metals from industrial wastewaters

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Heavy metals are water pollutants that have caused environmental problems around the world. These pollutants are non-degradable, highly toxic and carcinogenic and should be removed from water sources and effluents due to adverse effects on human, animal and plant health. In this project, the synthesis of a biodegradable nanocomposite hydrogel containing cellulose-based porous nanosilica is proposed to remove heavy metals from aqueous solutions / industrial effluents. This nanocomposite hydrogel is synthesized using a three-dimensional polymer network containing glycerol and an organic acid with hydroxyl, cellulose and porous nanosilica functional groups. Its structure, chemical composition, morphology and thermal / mechanical properties are studied by various methods and are used to remove heavy metals from aqueous solutions. Porous nanosilica is expected to improve not only the adsorption capacity, but also the thermal and mechanical stability of this nanocomposite hydrogel. Also, this hydrogel is highly biodegradable and non-toxic due to the absence of acrylic monomers in its polymer network. Therefore, the introduced nanocomposite hydrogels can be considered as a biodegradable and low cost adsorbent for effective removal of heavy metal ions from water.

Key words: Environmental Chemistry, Pollution Control, Wastewater treatment**Biography**

30 years of teaching and research experience at the University of Tehran Experiences of design and construction of treatment plant - operation and management of treatment plant - disposal of waste leachate

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