

Cyclodextrin-ionic liquid polyurethanes for application in drinking water treatment

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Abstract

The prevalence of toxic contaminants in water remains a huge challenge for water-supplying companies and municipalities. Both organic and inorganic (especially heavy metals) pollutants are often present in water distribution networks. The presence of these contaminants in drinking water poses a major risk to human health. Organic and inorganic pollutants often co-occur in drinking water networks. However, at present there is no water treatment intervention that simultaneously removes both organic and inorganic pollutants from water to desirable levels. In our laboratories, recent studies have shown that both functionalised and un-functionalised cyclodextrin (CD) polymers are capable of removing organic pollutants from water, with the functionalised CD polymers showing an enhanced absorption capability. Ionic liquids (ILs), on the other hand, have been reported to absorb heavy metals from aqueous media. In this paper, we report on the synthesis of several cyclodextrin-ionic liquid (CD-IL) polymers, a dual system capable of removing both organic and inorganic pollutants from water. This system has been tested and has proved to possess excellent capabilities for the removal of model pollutants such as *p*-nitrophenol (PNP), 2,4,6-trichlorophenol (TCP) and chromium (Cr⁶⁺) from aqueous media.

Keywords: organic and inorganic pollutants, CD polymers, ionic liquids, CD-IL polymers