

研究課題名：

Development of Adsorbents for Highly Efficient Removal and Recovery of Perfluorinated Organic Compounds from Water Environment

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要旨 (200 語程度)：

Efficient and complete removal of perfluorinated organic compounds such as perfluorooctane sulfonate (PFOS) and perfluorooctanate (PFOA) from the water environment is a crucial problem from the viewpoints of global environmental conservation. In this study, we examined the adsorption capability of two kinds of cyclodextrin (CD) polymers, cross-linked CD polymers and CD-grafted polymers, towards perfluorinated organic compounds in water. The former cross-linked CD polymers were prepared by the reaction of CDs with diisocyanates as a crosslinker. The latter CD-grafted polymers were synthesized by the reaction of poly( $\gamma$ -glutamic acid) with 6-*O*-aminated CD and subsequently with L-phenylalanine ethyl ester. These CD polymers were insoluble in water. The cross-linked CD polymers showed high adsorption capability towards perfluorinated organic compounds in water. In particular, the cross-linked  $\beta$ -CD polymer which was prepared by the reaction of partially-methylated  $\beta$ -CD with hexamethylene diisocyanate exhibited extremely high adsorption capability. Using this polymer as an adsorbent, PFOS and PFOA, whose initial concentrations were 50 ppb, were almost completely removed from water (removal percentages were more than 99.6%). On the other hand, the CD-grafted polymers showed lower adsorption of perfluorinated organic compounds in water. The elaborate design and synthesis of cross-linked CD polymers, based on the results obtained in this study, would result in adsorbents with higher adsorption capability towards perfluorinated organic compounds in water.

キーワード (5 語以内)：

Perfluorinated Organic Compounds、Adsorbent、Cyclodextrin、Water Environment、Polymer