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Enantioseparation on optically active poly(diphenylacetylene)s as chiral stationary phases for HPLC

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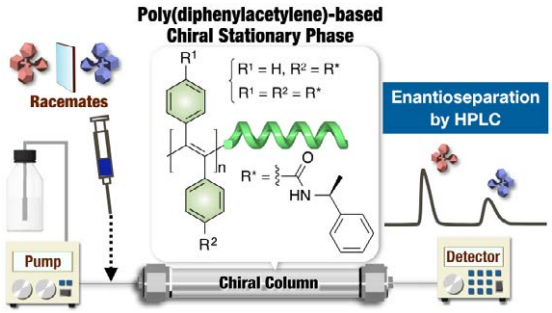
Enantioseparation by high performance liquid chromatography (HPLC) is recognized as one of the most popular and effective methods for both analyzing the composition of enantiomeric mixtures and obtaining pure enantiomers, and a large number of chiral stationary phases (CSPs) have been developed to resolve various racemates. Several optically active helical poly(phenylacetylene)s bearing polar functional groups as a chiral recognition site have been reported to exhibit good chiral recognition abilities toward some racemates due to the preferred-handed helical conformation when used as CSPs for HPLC. On the other hand, the number of optically active poly(diphenylacetylene)s bearing polar functional groups reported so far is very limited and poly(diphenylacetylene)-based CSPs have not yet been reported. In this study, we synthesized optically active poly(diphenylacetylene) derivatives bearing amide groups as effective chiral recognition sites by the macromolecular reaction of the optically inactive precursor poly(diphenylacetylene)s bearing carboxy groups with optically active amines and investigated their chiral recognition abilities as CSPs for HPLC. The obtained polymers showed good chiral recognition ability towards diverse racemates when used as CSPs for HPLC. Notably, the preferred-handed helical conformation was induced on the polymer backbone by the thermal annealing process, which was applied after the introduction of the optically active pendants via a polymer reaction. The chiral recognition abilities of the polymers with a preferred-handed helicity were greater than those of the as-prepared polymers without a preferred-handed helicity. These results indicated that the macromolecular helicity induced in the polymer backbone by thermal annealing as a consequence of the effect of the chiral pendant groups was playing an important role in the high chiral recognition ability of these poly(diphenylacetylene) derivatives.



Biography

Katsuhiro Maeda completed his BS in 1993, MS in 1995, and PhD in 1998 at Nagoya University. In 1998, he joined the Graduate School of Molecular Design and Engineering at Nagoya University as an Assistant Professor and was promoted to Associate Professor in 2002. He moved to Kanazawa University in 2008 and was appointed as a full Professor in 2015. He has published more than 80 original papers.

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