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Role of Filled P*L*GA in Improving Enantioselectivity of Glu-GO/P*L*GA Composite Membranes

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Abstract

The primary aim of this investigation was to improve the chiral separation performance of graphene oxide (GO) based composite membranes via tuning the interlayer spacing between GO sheets using the association of poly(L-Glutamic acid sodium), P*L*GA, onto the surface of GO sheets. Results show that: i) compared with conventional chiral separation membranes, these membranes exhibit superior chiral resolution properties, which are 1-2 orders of magnitude higher in the flux and greater in the enantioselectivity; ii) compared with pristine L-Glutamic modified GO membranes, they also afford a significant improvement in enantioselectivity with a slight reduction in flux. In present work, it is demonstrated that in such composite membranes, the incorporated P*L*GA can not only serve as an additional chiral recognizing agent, facilitating the transport of D-isomer of the chiral probe, but also as a kind of filler, reducing the size of pores or channels between GO sheets. Especially, both roles can significantly contribute to enhancing the enantioselectivitiy of composite membranes. Our findings indicate that the combination of GO-based materials and polypeptides might offer unusual control in the selectivity and the flux of the corresponding composite membranes,