

Interpenetrating Polymer Network Gel for the Structure Sorting of Single-Wall Carbon Nanotubes

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Gel column chromatography has been proved to be one of the most efficient methods for large-scale metal/semiconductor (M/S) separation and further single-chirality separation of single-wall carbon nanotubes (SWCNTs) [1]. In this method, a gel of crosslinked dextran network has been widely used as the separation medium. Since a separation gel plays a critical role, we have been working on the development of functional separation gels by designing the gel structures.

In this study, we synthesized a novel interpenetrating polymer network (IPN) gel for the separation of SWCNTs. In this system, the gel contains two independent polymer networks: dextran network and poly (acrylic acid) network. The dextran network can provide effective adsorption sites for the separation of SWCNTs. Fig. 1 shows the optical absorption spectra of M- and S-SWCNTs that were separated by the IPN gel. On the other hand, the poly (acrylic acid) network is highly pH sensitive, enabling the easy controlling of the gel structures, e.g. pore size and adsorption site density. Because the gel structures strongly affect the separation performance, the new gel may contribute to the design of environmental stimuli-triggered SWCNT separation system.

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[1] H. Liu et al. Nat. Commun **2**, 309 (2011).

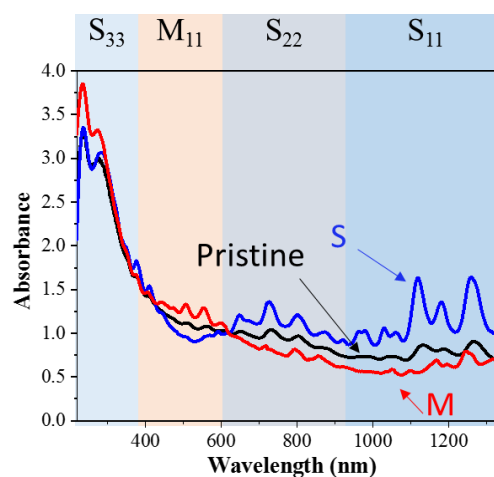


Fig. 1. Optical absorption spectra of pristine HiPco SWCNTs and separated M- and S-SWCNTs.