PVK Modified Single-Walled Carbon Nanotubes with Effective Photoinduced Electron Transfer

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I. The Synthesis of PVK-SWNT

To a solution of PVK (80 mg) in 30 ml of dry, degassed THF solution, 20 mg of NaH was added under nitrogen protection at room temperature. After stirring for 28 hr, a suspension of 10 mg of SWNTs in dry degassed THF was added to the above solution, followed by vigorously stirring for 96 hr. The reaction was quenched by one drop of methanol. After removing the residual insoluble materials through centrifugation, the solution was purified by repeated precipitation from THF solution into methanol and then hexane. The resulting precipitation was then dissolved in THF and filtered through a 0.45 µm PTFE membrane, a homogeneous brown solution was obtained, denoted as PVK-SWNT.

II. The Synthesis of PB-SWNT

80 mg of cis-1,4-polybutadiene and 10 mg of SWNTs was mixed in 30 ml of dry cyclohexane under nitrogen protection at room temperature. Then 0.14 ml of BuLi hexane solution (1.6 M) was added with stirring. After the addition of tetramethylethylene-diamine (1:1 molar ratio with respect to BuLi, which was used to enhance the efficiency of the metallation of diene polymers), the reaction mixture was further stirred for 72 hr at room temperature. The reaction was quenched by one drop of methanol. After removing the residual insoluble materials through centrifugation, the solution was
then evaporated to remove cyclohexane. The resulting solid was dissolved in \( o \)-dichlorobenzene and purified by repeated precipitation from \( o \)-dichlorobenzene solution into hexane. The resulting precipitation was then dissolved in \( o \)-dichlorobenzene and filtered through a 0.45 \( \mu \)m PTFE membrane, a homogeneous brown solution was obtained, denoted as PB-SWNT.
Figure S-1. UV-VIS-NIR absorption spectra of the pristine SWNTs (solid line) in DMF and PB-SWNT (dash line) in o-dichlorobenzene.
Figure S-2. Raman spectra of the pristine SWNTs (solid line) and PB-SWNT (dash line).
Figure S-3. TGA weight loss data of PB (solid line) and PB-SWNT (dash line). Experiments were carried out in nitrogen. Scanning rate: 10 °C min\(^{-1}\).
Figure S-4. SEM image of PB-SWNT. Scale bar: 500 nm.
Figure S-5. ESR spectrum of PB-SWNT.