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Hybrid double wall nanotubes of π-conjugated polymers and inorganic metals

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We synthesized hybrid double wall nanotubes of π-conjugated polymer nanotubes and inorganic metal nanotubes through electrochemical synthetic method. For the π-conjugated polymers, polypyrrole (PPy), polythiophene (PT), and poly (3-methylthiophene) (P3MT) were synthesized in the nanoporous of anodisc alumina oxide (AAO) template. Inorganic metal (Ni or Cu) nanotubes were fabricated by electrochemical deposition outside the wall of of π-conjugated polymer nanotubes. To discern the formation and structure of the hybrid nano-systems, we used SEM and TEM. Structural, magnetic, and optical properties of the hybrid double wall nanotubes were examined by using X-ray diffraction (XRD), electron paramagnetic resonance (EPR), vibrating sample magnetometer (VSM), ultraviolet and visible (UV/vis) absorbance , and photoluminescence (PL) experiments.

Figure 1. Hysteresis loop of the wall nanotubes polypyrrole nanotubes enveloped by magnetic nickel nanotubes

References