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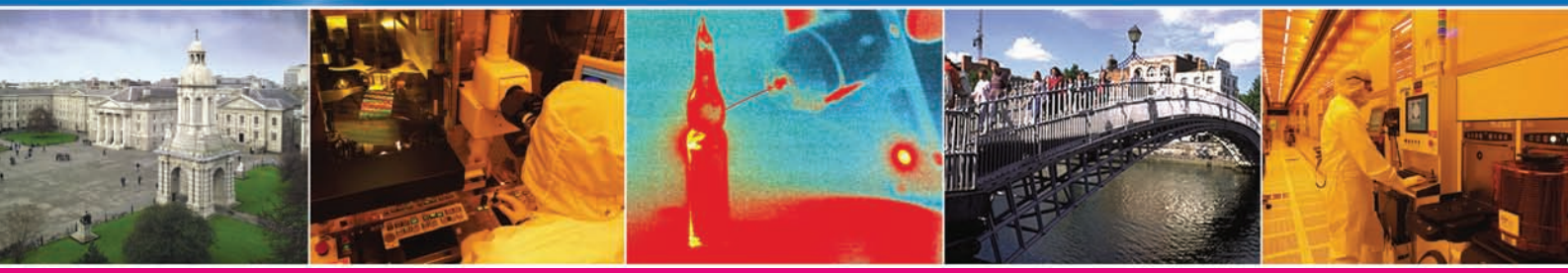

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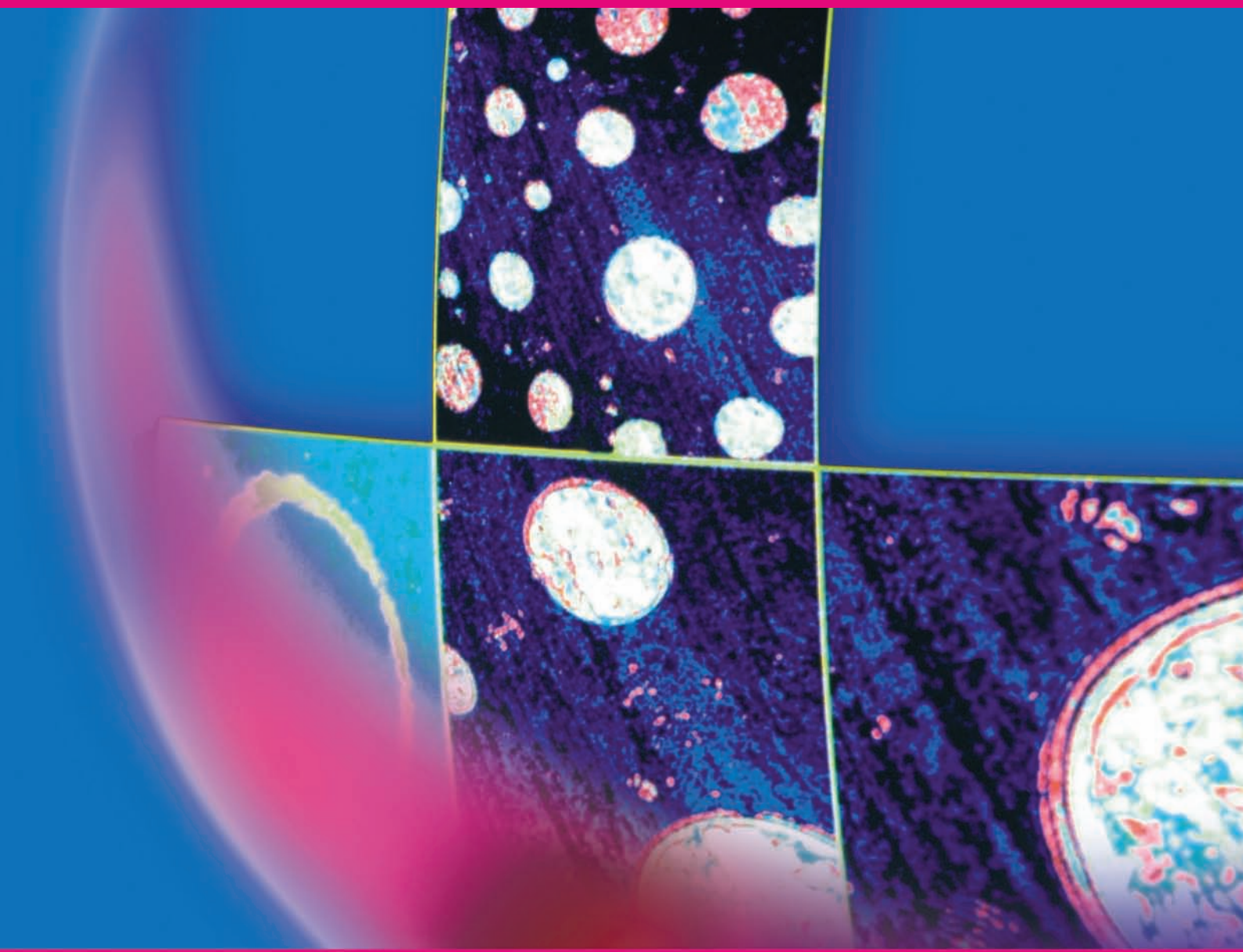

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Confocal Microscope Study of Single Strand of Light Emitting Polymer Nanotube

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We synthesized nanotubes of light emitting polythiophene (PT) and its derivatives such as poly (3-methylythiophene) (P3MT) by using nanoporous anodic aluminum oxide (Al_2O_3) template through electrochemical polymerization method. Hybrid double wall nanotubes (HDWNTs) of light emitting PT or P3MT covered with nickel (Ni) were also synthesized through sequential electrochemical method. To discern the formation and structure of the HDWNTs, we performed the experiments of scanning electron microscope (SEM), atomic force microscope (AFM) [Fig. 1 (a)], high-resolution transmission electron microscope (HR-TEM), and X-ray diffraction (XRD). Magnetic and optical properties of the HDWNTs were examined by using the experiments of vibrating sample magnetometer (VSM), ultraviolet and visible (UV/vis) absorbance spectra, and photoluminescence (PL). Through confocal microscope, we measured the PL of single strand of light emitting PT nanotube, P3MT nanotube, and HDWNTs [Fig. 1 (b)]. We compared the PL spectra of single strand of light emitting PT nanotube, P3MT nanotube, and P3MT/Ni HDWNTs. The change of the PL peak and intensity were observed for the single strand of P3MT/Ni HDWNTs.

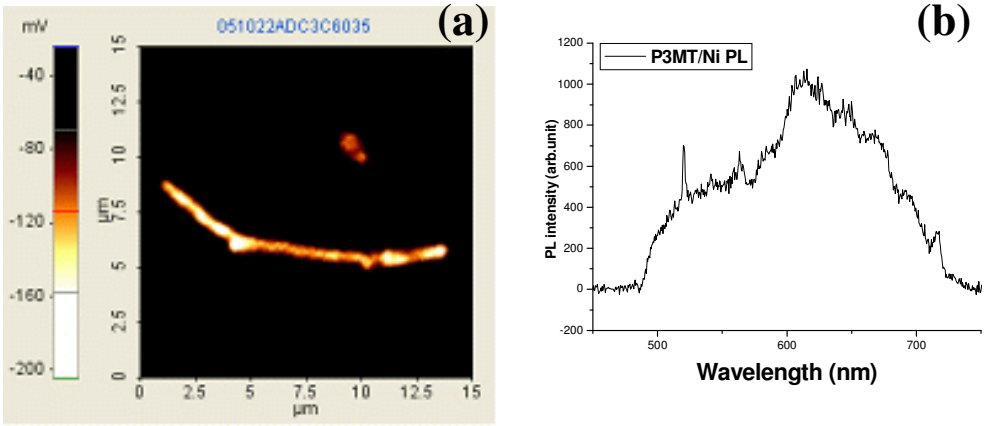

Fig. 1 (a) AFM image and (b) PL spectrum of the hybrid double wall nanotubes of P3MT/Ni