

Conductive quantum dot-encapsulated electrospun nanofibers from polystyrene and polystyrene-co-maleic anhydride copolymer blend as gas sensors

황이택, Rameshwar Tatavarty, 박지웅, 곽준혁¹, 이정오¹,
구만복*

고려대학교; ¹한국화학연구원
(mbgu@korea.ac.kr*)

Electrospinning was employed to obtain uniformly distributed Cadmium Selenide (CdSe)/Zinc Sulfide (ZnS) core shell quantum dot (QD) encapsulated nanofibers in polymeric mixture of 4:1 ratio of polystyrene (PS) and polystyrene-co-maleic anhydride (PSMA). Fluorescence and scanning electron microscopy (SEM) measurements were used to evaluate the uniform size distribution and uniformity of PS-PSMA nanofibers with high aspect ratios. The introduction of QDs only into the PS-PSMA nanofibers induced electrical conductivity. They also showed a two to three fold increase in electrical conductivity in the presence of volatile organic compounds. The obtained quantum-dot nanofibers (Qd-NFs) were 600-650 nm thick, photostable for more than six months, and applicable for electrical conductance or gas-based sensing applications.