Study on Chemical Stability of Functionalized ZnO Nanowires in Wet Solution

Khan Mohammad Rizwan, 라현욱, 김진태, 강보라, 임연호*
전북대학교
(yeonhoim@chonbuk.ac.kr*)

ZnO nanowires have attracted considerable research attention on account of their superior properties, such as large piezoelectric constant, wide band gap energy (3.37 eV), large exciton binding energy (60 meV), high thermal and mechanical stability. Therefore, it is suitable for the fabrication of variety of devices which includes transparent transistors, optoelectronic devices, chemical and biological sensors. Although ZnO nanowires are one of the promising candidates for various applications, robust surface functionalization methods with solubility and chemical stability in wet solution still remain a great challenge for chemical and biological sensor applications. In this work, we present schematic studies of chemical stability for functionalization methods of ZnO nanowires including covalent bonding of the silane based modifier with GPS and APTES silane molecules. The chemical stability of the functionalized ZnO nanowires was evaluated under various pH solutions. The chemical modification and solubility of functionalized ZnO nanowires were investigated by SEM, TEM and FT-IR. This result opens a broad perspective for the application of functionalized nanowire in biomedicine, chemical and biosensor applications.