

Effects of grain size inside palladium nanowire grown by electrochemical method in hydrogen sensing

강보라, 라현욱, 임연호*

전북대학교

(yeonhoim@chonbuk.ac.kr*)

With the increasing interest in nanoscale science and technology, nanowires have been the subject of a great deal of research in the past decade. In the fields of chemical and biological sensors, semiconductor and metallic nanowires would be expected to improve the sensitivity, response time and power requirements due to small size and high specific surface area. The most common techniques for fabricating such nanowires are the bottom-up paradigms with the major drawback that the nanowires need to be located in a predetermined position for the integration of nanowire-based sensors. To address these issues, we developed novel DC assisted dielectrophoresis (DEP) process using floating electrode to create palladium (Pd) nanowire in predefined electrodes and demonstrated the hydrogen detection in the concentration range from 100 to 1000 ppm with high reproducibility due to nanogap bridging between the Pd grains. In this work, we investigated various effects of the grain size inside the Pd nanowire with the variation of DEP force, DC bias, and solution concentrations in hydrogen sensing.