

# Synthesis And Applications Of ZnO Nanonail Crystals By Thermal Evaporation

M. M. Rahman and C J IL

Laboratory of Nanoscience & Nanotechnology, Department of Chemistry, Chonbuk National University, Jeonju 561-756, South Korea.

Well-crystallized zinc oxide nanonails have been synthesized in a large quantity via a thermal evaporation method using the metallic zinc powder in the presence of oxygen without the use of any metal catalyst or additives. The detailed structural characterizations confirmed that the as-synthesized products are single crystalline with the wurtzite hexagonal phase and grown along the [0001] direction. Raman and photoluminescence (PL) spectra reveal that the grown nanonail are well-crystallized and exhibit good optical properties, respectively. The modified gold electrode with ZnO nanonails is used for the fabrication and electrochemical characterization, and applications as a effective bio-chemical sensors.

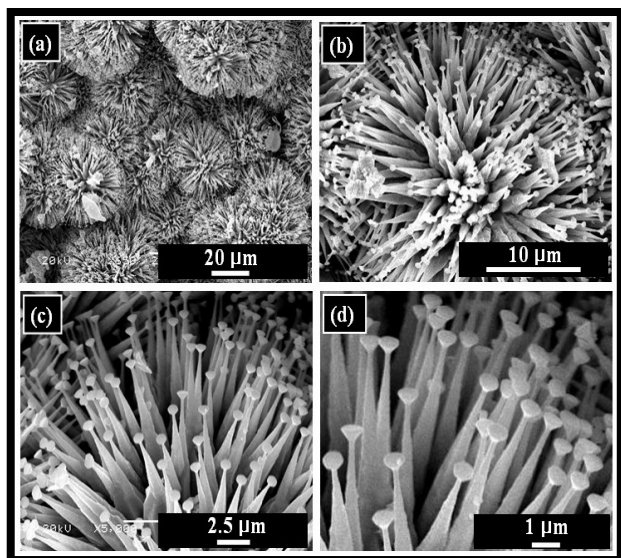


Figure 1. (a and b) Low and (c and d) high magnification SEM images of ZnO nanonails synthesized using metallic zinc powder and oxygen gas as source materials for zinc and oxygen, respectively.

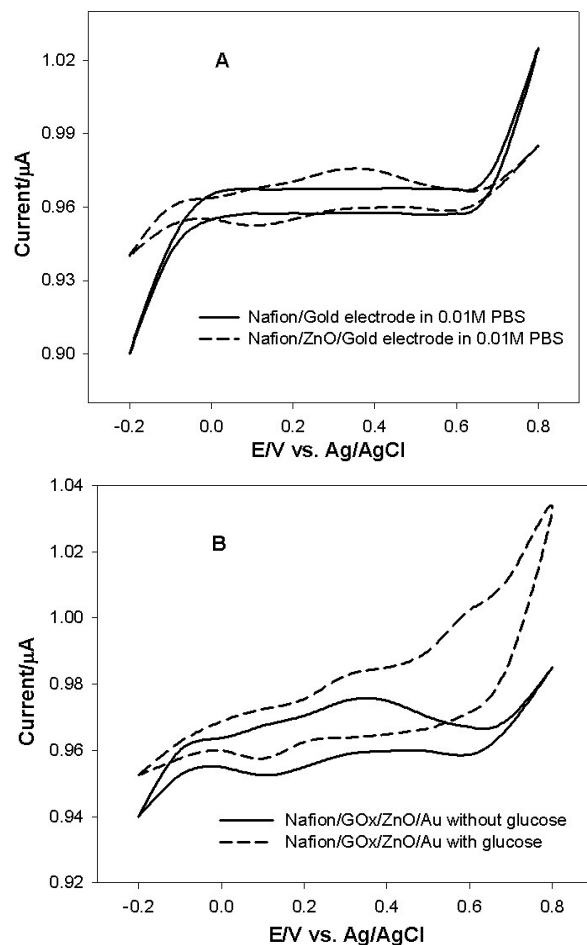


Figure 2. **[A]**. Cyclic voltammograms of Nafion/gold electrode (solid line) and Nafion/ZnO/gold electrode (dotted line) in 0.01M, pH 7.3 PBS buffer at scan rate of 50 mV/s. **[B]**. Cyclic voltammograms of Nafion/GOx /ZnO/gold electrode in the same 0.01M PBS buffer solution (pH 7.3) in the absence (solid line) and presence (dotted line) of 3 mM glucose.

\* Author to whom correspondence should be addressed;  
 Fax: +82-63-270-3408, Phone: +82-16-9214-7869,  
 E- mail: mmr822@yahoo.com