

Effects of Solvents on ZnO Nanoparticles Synthesis via Sol-gel Method

Suraya Sulaiman^{1,2}, Nur Syazwa Zamri¹, Radhiyah Abd Aziz¹, Mohamad Farid Mohamad Sharif¹,
Natasha Ahmad Nawawi³, and Nur Ayuni Jamal⁴

1Universiti Malaysia Pahang, 26600 Pekan, Pahang, Malaysia

e-mail: surayas@ump.edu.my

2Universiti Teknologi Malaysia, 81310 Johor Bahru, Johor, Malaysia

3Universiti Teknologi Mara, 13500 Permatang Pauh, Pulau, Pinang, Malaysia

4Universiti Islam Antarabangsa Malaysia, 50728 Kuala Lumpur, Malaysia

ABSTRACT

Zinc oxide nanoparticles have been prepared by the sol-gel method at different solvent (methanol (MeOH), ethanol (EtOH) and distilled water) and at different calcination temperatures (700 °C, 800 °C and 900 °C). The phase and microstructure of the prepared ZnO powder were investigated. ZnO powder were characterized by using XRD, EDX and FESEM. XRD analysis shows ZnO exhibited a hexagonal (wurtzite) structure with crystallite sizes 34.146 nm, 34.283 nm, and 34.523 nm and FESEM micrographs show that synthesized ZnO has a nanorod-like structure with an average particle size, 113.716 nm, 125.825 nm, and 141.725 nm for solvent methanol, ethanol and distilled water and calcination temperature of 700 °C, 800 °C and 700 °C respectively. The obtained ZnO nanoparticles are homogenous and consistent in size, corresponding to the XRD results that exhibit good crystallinity. EDX analysis shows pure ZnO with different solvents at 700 °C calcination temperatures. The surface of the ZnO also exhibits elements of O and Zn. This result has confirmed that the ZnO nanoparticles has high purity. Based on the analysis from the XRD and FESEM test, the best solvent with the best calcination temperature has been chosen, which is Methanol at 700 °C.

KEYWORDS: Zinc oxide nanoparticle, Grain size, Sol-gel method, Solvent

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