

Pengaruh penambahan atom Ni terhadap struktur dan sifat optik pada nanopartikel ZnO yang disintesa dengan metode kopresipitasi =
Influence of Ni atom for structural and optical properties of ZnO nanoparticle synthesized by coprecipitation technique

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Abstrak

Nanopartikel Ni doped ZnO dengan empat variasi konsentrasi (3, 6, 10, dan 20 %) telah berhasil disintesa menggunakan metode kopresipitasi menggunakan reagen zinc sulfate heptahydrate ($ZnSO_4 \cdot 7H_2O$) dan nickel (II) nitrate hexahydrate ($Ni(NO_3)_2 \cdot 6H_2O$). Semua sampel dikarakterisasi dengan menggunakan spektroskopi EDX (Energy Dispersive X-ray spectroscopy), XRD (X-ray Diffraction), dan spektroskopi UV-Vis. Pengukuran nilai crystallite size telah dilakukan menggunakan metode Scherrer dan Williamson-Hall. Nilai crystallite size mengalami penurunan seiring dengan bertambahnya konsentrasi atom Ni pada nanopartikel ZnO. Tiga metode Williamson-Hall juga digunakan untuk menghitung nilai strain, stress, dan energy density. Nilai celah pita energi nanopartikel Ni doped ZnO cenderung berkurang dengan peningkatan persen atom Ni.

.....A series of Ni doped ZnO nanoparticles (3, 6, 10, and 20 %) are successfully synthesized by coprecipitation technique with zinc sulfate heptahydrate ($ZnSO_4 \cdot 7H_2O$) and nickel (II) nitrate hexahydrate ($Ni(NO_3)_2 \cdot 6H_2O$). The composition, structural and optical characterizations were performed by EDX (Energy Dispersive X-ray spectroscopy), XRD (X-ray Diffraction), and UV-Visible. Crystallite size were determined from X-ray peak broadening using Scherrer and Williamson-Hall. The presence of Ni tends to reduce crystallite size. A modified W-H plot has been worked out and accepted as determining not only the crystallite size but also strain, stress, and energy density. The presence of Ni tends to reduce the width of the optical gap associated with increasing of Ni dopants.