Pengaruh doping kobalt (Co) dan penambahan surfaktan sodium dodecyl sulfate (SDS) terhadap sifat fisis, sifat optis, dan aktivitas fotokatalitik nanokristal Zno = Influence of cobalt (Co) doping and surfactant sodium dodecyl sulfate (SDS) on the physical properties optical properties and photocatalytic activity of Zno nanocrystalline

Annisa Noorhidayati, author

Abstrak

[ABSTRAK
ZnO:Co/SDS dengan variasi konsentrasi dopant 3 - 13 at% disintesis menggunakan metode kopresipitasi Komposisi sampel dan keberadan dopant Co serta SDS diuji menggunakan spektroskopi Energy Dispersive X Ray EDX Fourier Transform Infrared FTIR dan Electron Spin Resonance ESR Pengaruh dopant dan SDS terhadap struktur kristal ZnO diuji melalui pengukuran X Ray Diffraction XRD Keempat sampel menunjukkan struktur hexagonal wurtzite Fase sekunder Zn OH 2 terdeteksi pada sampel ZnO Co SDS 13 at Pengujian Field Emission Scanning Electron Microscopy FESEM menunjukkan sampel yang disintesis memiliki bentuk menyerupai lembaran Pengaruh dopant dan SDS terhadap sifat optis sampel diuji melalui spektroskopi UV Vis Diffuse Reflectance UV Vis Analisis spektrum UV Vis dengan fungsi Kubelka Munk menunjukkan nilai energy gap sampel menurun dengan peningkatan konsentrasi dopant Aktivitas fotokatalitik sampel diuji dengan mengamati degradasi warna pada larutan uji metil jingga MO dan metilen biru MB Sampel mampu mendegradasi MO sebanyak 85 dan MB sebanyak 89 dengan pemaparan sinar Ultraviolet 200 nm selama 2 jam Spesies utama dalam proses fotodegradasi diuji dengan menambahkan scavenger pada larutan uji Pada sistem ini diketahui pengaruh elektron e hole h gugus radikal hidroksil OH.
<hr>
<i>ABSTRACT
;ZnO:Co/SDS with doping concentration varies between 3 ? 13 at% were synthesized by co-precipitation method. Sample composition also dopant and SDS existence characterized by Energy Dispersive X-Ray (EDX), Fourier Transform Infrared (FTIR), and Electron Spin Resonance (ESR) spectroscopy. The effect of dopant and SDS to crystal structure of ZnO were examined by X-Ray Diffraction (XRD). All samples shown hexagonal wurtzite structure. Secondary phase of Zn(OH)2 were detected at ZnO:Co/SDS 13 at%. Field Emission Scanning Electron Microscopy (FESEM) measurement shown the as synthesized samples has nanosheet-like shape. Dopant and SDS effect to optical properties observed by UVVis Diffuse Reflectance (UV-Vis DRS) spectroscopy. UV-Vis reflectance spekctrum were analyzed by Kubelka-Munk relation, it is shown the energy gap of samples decreased as the doping concentration increased. Photocatalytic activity of samples were tested by observing the degradation of methyl orange (MO) and methylene blue (MB) as dyes model. Under Ultraviolet irradiation (200 nm) irradiation for 2h, samples were able to degrade MO to 85% and MB to 89%. Main species in photodegradation mechanism tested by adding scavenger. It is shown the

effect of electron (e-)> hole (h+)> hydroxyl radical species (OH-)., ZnO:Co/SDS with doping concentration varies between 3 – 13 at% were
synthesized by co-precipitation method. Sample composition also dopant and SDS existence characterized by Energy Dispersive X-Ray (EDX), Fourier Transform Infrared (FTIR), and Electron Spin Resonance (ESR) spectroscopy. The effect of dopant and SDS to crystal structure of ZnO were examined by X-Ray Diffraction (XRD). All samples shown hexagonal wurtzite structure. Secondary phase of Zn(OH)2 were detected at ZnO:Co/SDS 13 at%. Field Emission Scanning Electron Microscopy (FESEM) measurement shown the as synthesized samples has nanosheet-like shape. Dopant and SDS effect to optical properties observed by UVVis Diffuse Reflectance (UV-Vis DRS) spectroscopy. UV-Vis reflectance spekctrum were analyzed by Kubelka-Munk relation, it is shown the energy gap of samples decreased as the doping concentration increased. Photocatalytic activity of samples were tested by observing the degradation of methyl orange (MO) and methylene blue (MB) as dyes model. Under Ultraviolet irradiation (200 nm) irradiation for 2h, samples were able to degrade MO to 85% and MB to 89%. Main species in photodegradation mechanism tested by adding scavenger. It is shown the effect of electron (e-)> hole (h+)> hydroxyl radical species (OH-).]