ABSTRAK

ANALISIS STRUKTUR FASA, SIFAT TERMAL, DAN ENERGI *BAND GAP* NANOMATERIAL PERAK SILIKA (Ag/SiO_2) YANG DISINTESIS MENGGUNAKAN METODE SOL GEL PADA SUHU *SINTERING* 850 °C

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Sintesis perak silika (Ag/SiO_2) dengan metode sol gel menggunakan silika dari sekam padi telah berhasil dilakukan. Nanopartikel perak disintesis menggunakan perak nitrat ($AgNO_3$) dengan konsentrasi 8 mM dengan metode reduksi pada suhu 90 ^oC. Zat pereduksi dan penstabil menggunakan trisodium sitrat 64 mM. Nanomaterial Ag/SiO_2 dibuat dengan perbandingan sol silika dan nanopartikel perak sebesar 1:1. Sampel Ag/SiO_2 dianalisis dengan XRD, TGA/DTA, dan Uv-Vis untuk mengetahui struktur fasa, sifat termal, dan energi *band gap*. Hasil analisis XRD menunjukkan struktur silika yang terbentuk adalah kristobalit dan kristal perak berbentuk *face center cubic* (FCC). Hasil analisis TGA/DTA diperoleh nanomaterial Ag/SiO_2 mengalami susut massa sebesar 12%. Hasil analisis Uv-Vis Ag/SiO_2 memiliki puncak serapan maksimum pada panjang gelombang 412 nm dengan energi *band gap* sebesar 2,25 eV.

Kata kunci : perak silika, sekam padi, perak nitrat, XRD, TGA/DTA, Uv-Vis

ABSTRACT

ANALYSIS OF PHASE STRUCTURE, THERMAL PROPERTIES, AND ENERGY OF BAND GAP SILVER SILICA (Ag/SiO_2) NANOMATERIAL SYNTHESIS USING SOL GEL METHOD AT SINTERING TEMPERATURE 850 ℃

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The synthesis of silica silver (Ag/SiO_2) by the sol-gel method using silica from rice husk has been successfully carried out. Silver nanoparticles were synthesized using 8 mM silver nitrate ($AgNO_3$) by reduction method at 90 ℃. The reducing agent and stabilizer used was trisodium citrate 64 mM. Ag/SiO_2 nanomaterials were made with a 1:1 ratio of silica sol and silver nanoparticles. Ag/SiO_2 samples were analyzed by XRD, TGA/DTA, and Uv-Vis to determine the phase structure, thermal properties, and band gap energy. The results of the XRD analysis showed that the structure of the silica formed was cristobalite and silver crystals in the form of face center cubic (FCC). The results of the TGA/DTA analysis showed that the Ag/SiO_2 nanomaterial experienced a mass loss of 12%. The results of the Uv-Vis analysis of Ag/SiO_2 have a maximum absorption peak at a wavelength of 412 nm with a band gap energy of 2.25 eV.

Keywords : *silver silica, rice husk, silver nitrate, XRD, TGA/DTA, Uv-Vis*