

ABSTRACT

SYNTHESIZE AND CHARACTERIZATION OF CALSIUM SILICATE BASED BLOOD COCKLE SHELLS CALCINATION TEMPERATURE AT 1000 °C

By

Elisa Puspita

*The objective of this research is to synthesize of calcium silicate based calcium carbonate from blood cockle shells (*Anadara granosa*) and CaCO_3 commercial as control, along with rice husk as silica by using solid state method and calcined at 1000 °C. The samples obtained were characterized using Differential Thermal Analysis-Thermogravimetric Analysis (DTA-TGA), X-Ray Diffraction (XRD), Scanning Electron Microscopy-Energy Dispersive X-ray (SEM-EDX), and Fourier Transform Infra-Red (FTIR). The DTA-TGA result showed that calcium silicate occurs mass shrinkage caused by decomposition CaCO_3 to CaO , which blood cockle shells calcium silicate is 27,52 % and CaCO_3 commercial calcium silicate is 28,03%. XRD result showed that formed $\beta\text{-CaSiO}_3$ and $\alpha\text{-CaSiO}_3$ phase, which $\beta\text{-CaSiO}_3$ phase is major phase. SEM result showed that samples have a spheroid particles and surfaces begin to agglomerated, which an average particles size of blood cockle shells calcium silicate is 0,287 μm and CaCO_3 commercial calcium silicate is 0,297 μm . EDX result showed that sample contained Ca, Si, O, C, and K. The functional groups presence in the FTIR result showed that vibration of Si-O, Si-O-Si bonding, vibration of Si-O-Ca, vibration of O-Si-O, vibration of CO_3^{2-} , and absorption O-H.*

Keywords: *Calcium silicate, $\beta\text{-CaSiO}_3$, blood cockle shells (*Anadara granosa*), rice husk silica, calcination.*

ABSTRAK

SINTESIS DAN KARAKTERISASI KALSIMUM SILIKAT BERBAHAN DASAR CANGKANG KERANG DARAH PADA SUHU KALSINASI 1000 °C

Oleh

Elisa Puspita

Penelitian ini bertujuan untuk mensintesis kalsium silikat berbahan dasar kalsium karbonat dari cangkang kerang darah (*Anadara granosa*) dan CaCO_3 komersil sebagai kontrol, serta sekam padi sebagai sumber silika yang dikalsinasi pada suhu 1000 °C menggunakan metode reaksi padatan. Sampel yang diperoleh dikarakterisasi menggunakan *Differential Thermal Analysis-Thermogravimetric Analysis* (DTA-TGA), *X-Ray Diffraction* (XRD), *Scanning Electron Microscopy-Energy Dispersive X-ray* (SEM-EDX), dan *Fourier Transform Infra-Red* (FTIR). Hasil karakterisasi DTA-TGA menunjukkan kalsium silikat mengalami penyusutan massa dikarenakan proses dekomposisi CaCO_3 menjadi CaO , dimana kalsium silikat cangkang kerang darah sebesar 27,52 % dan kalsium silikat CaCO_3 komersil sebesar 28,03 %. Hasil karakterisasi XRD menunjukkan bahwa terbentuk fasa $\beta\text{-CaSiO}_3$ dan $\alpha\text{-CaSiO}_3$, dimana fasa mayor merupakan fasa $\beta\text{-CaSiO}_3$. Hasil karakterisasi SEM menunjukkan bahwa partikel berbentuk *spheroid* (bulat) dan permukaan mulai menggumpal (beragglomerasi), dengan ukuran rata-rata kalsium silikat cangkang kerang darah sebesar 0,287 μm dan kalsium silikat CaCO_3 komersil sebesar 0,297 μm . Hasil karakterisasi EDX menunjukkan adanya kandungan unsur-unsur Ca, Si, O, C, dan K. Gugus fungsi yang terbentuk pada FTIR menunjukkan adanya vibrasi Si-O, ikatan Si-O-Si, vibrasi Si-O-Ca, vibrasi O-Si-O, vibrasi CO_3^{2-} , dan absorpsi O-H.

Kata kunci: Kalsium silikat, $\beta\text{-CaSiO}_3$, cangkang kerang darah (*Anadara granosa*), silika sekam padi, kalsinasi.