Sintesis dan karakterisasi nanokomposit besi oksida/nanographene platelets sebagai material aditif untuk sifat termal stearic acid = Preparation and characterization of nanocomposite iron oxide nanographene platelets as material additivies for thermal properties of stearic acid

Muhammad Khalish Nuryadin, author

Abstrak

Nanopartikel Besi Oksida dan nanokomposit Besi Oksida/NGP (NanoGraphene platelets) sebagai material aditif telah disintesis menggunakan metode sol-gel. Komposit PCM (Phase change material) SA (Stearic acid)-Besi Oksida dan SA-Besi Oksida/NGP disintesis menggunakan metode sonifikasi dengan varisis wt.% yaitu 1 wt.%, 3 wt.% dan 5 wt.%. Sampel dikarakterisasi dengan X-Ray diffraction, Fourier Transform Infrared Spectroscopy, Energy Dispersive X-Ray, Field Emission Scanning Electron Microscope, Differential Thermal Analysis-Thermogravimetric Analysis dan Differential Scanning Calorimetry. Nanokomposit memperlihatkan fase gabungan struktur kristal cubic spinel dengan bidang struktur NGP. Spektrum FTIR mengkomfirmasi pencampuran material aditif pada Stearic acid tidak merubah struktur ikatan kimia. Nanokomposit tercampur dispersi dengan baik di atas Stearic acid dan sisa jumlah presentase kehilangan berat dalam kurva Thermogravimetric sama dengan variasi wt.%. Hasil karakterisasi sifat termal komposit PCM memperlihatkan peningkatan kapasitas panas dan kalor latent. Peningkatan kalor latent maksimum pada SA-Besi Oksida/NGP sebesar 23% dan SA-Besi Oksida/NGP sama dengan 30% terjadi pada wt.% penambahan yang sama.

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Nanopartikel Iron oxide and nanocomposite Iron oxide/NanoGraphene platelets (NGP) as material additives have been synthesized using sol-gel method. Phase change material (PCM) composites SA(Stearic acid)-Iron oxide and SA-Iron oxide/NGP have been synthesized using sonication method with various wt.% respectively by 1 wt.%, 3 wt.% and 5 wt.%. Sample were characterized with various method such as X-Ray diffraction, Fourier Transform Infrared Spectroscopy, Energy Dispersive X-Ray, Field Emission Scanning Electron Microscope, Differential Thermal Analysis-Thermogravimetric Analysis and Differential Scanning Calorimetry. Nanocomposite show the mixture of cubic spinel crystal structures with plane of NGP structure. The FTIR spectra confirmed that mixing of material additivies with Stearic acid not showing changes in chemical structure. Nanocomposite well dispersed in surface of Stearic acid and weight loss of PCM composites in Thermogravimetric curve same as with wt.% addition.Thermal characterization of PCM composites shows that enhancement in heat capacity and latent heat. The enhancement of latent heat in SA-Iron oxide and SA-Iron oxide/NGP by about 23 % and 30% using the same 1 wt. % of material additives.