Extended Abstract Journal of Clinical and Bioanalytical Chemistry 2021
Vol.5 No.1

Characterization of Physical and Thermal Properties of Biofield Treated Neopentyl glycol

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Neopentyl glycol (NPG) has been extensively used as solid-solid phase change materials (PCMs) for thermal energy storage applications. The objective of the present study was to evaluate the impact of biofield treatment on physical, spectral and thermal properties of NPG. The study was performed in two groups (control and treated). The control group remained as untreated, and treatment group was subjected to Mr. Trivedi's biofield treatment. The control and treated NPG were characterized by X-ray diffraction (XRD), differential scanning calorimetry (DSC), thermogravimetric analysis (TGA), and Fourier transform infrared (FT-IR) spectroscopy. XRD study revealed the decrease in crystallite size of treated NPG by 21.97% as compared to control sample. DSC studies showed slight change in melting temperature of treated NPG as compared to control sample. TGA analysis showed 55.66% weight loss in control NPG however, the treated sample showed reduction in weight loss (44.81%). The global price rise of petroleum products and fossil fuel has led scientists to design new strategies for thermal energy regeneration and conservation. The latent heat storage devices (LTHS) prepared from phase change materials (PCMs) are interesting choice for thermal energy storage applications. The LTHS are widely used in several applications such as condensation heat recovery, building energy conservation, temperature regulating textiles and solar energy systems. Many compounds have been used recently for fabricating the LTHS i.e., fatty acids, poly ethylene glycol (PEG), alcohols and mixture of them. Several types of PCMs are available these days such as solid liquid PCMs, solid-solid PCMs and liquid-gas PCMs. Recently polyalcohols have gained significant attention as PCMs.PEG is commonly used as solid liquid PCM owing to its excellent properties such as, high latent heat of fusion, suitable melting point,and being chemically inert and stable . Feng et al. had prepared polyethylene glycol/active carbon composites as shape stabilized PCMs. Similarly, neopentyl glycol (NPG) was also investigated as potential material for solid-solid PCMs. Hence, by considering the phase change property of NPG, authors decided to investigate the influence of biofield treatment on its physical, spectral and thermal properties which could be further utilized for thermal storage applications. Neopentyl glycol was procured from S D Fine Chemicals Limited,India. The sample was divided into two parts; one was kept as a control sample, while the other was subjected to Mr. Trivedi's biofield treatment and coded as treated sample. The treatment group was in sealed pack and handed over to Mr. Trivedi for biofield treatment under laboratory condition. Mr. Trivedi provided the treatment through his energy transmission process to the treated group without touching the sample. The control and treated samples were characterized by XRD, DSC, TGA and FT-IR techniques. NPG showed XRD peaks at 2θ equals to 11.96º , 16.22ºand 18.42º. The result showed increase in intensity of treated NPG as compared to control sample which may be correlated to increase in crystallinity of the sample. It is hypothesized that biofield treatment may induced long-range symmetrical pattern in the treated NPG as compared to control that led to increase in crystallinity. The crystallite size was calculated using Scherrer formula (crystallite size=kλ/b cos θ). The control NPG showed crystallite size 100.16 nm and that was decreased in treated NPG (78.15 nm). The result showed 21.97% decrease in crystallite size in treated NPG as compared to control sample. Mahmoud et al. reported that lattice strain induced by mechanical milling may causes significant reduction in crystallite size. Hence, it is assumed here that biofield treatment may generate internal strain in the treated
NPG molecules that caused decrease in crystallite size. Previously, our research group reported that biofield treatment had substantially reduced the crystallite size of vanadium pentoxide powders. It was proposed that internal strains made dislocations to move on the The control and treated NPG were characterized by X-ray diffraction (XRD), differential scanning calorimetry (DSC), thermogravimetric analysis (TGA), and Fourier transform infrared (FT-IR) spectroscopy. XRD study revealed the decrease in crystallite size of treated NPG by 21.97% as compared to control sample. DSC studies showed slight change in melting temperature of treated NPG as compared to control sample. TGA analysis showed 55.66% weight loss in control NPG however, the treated sample showed reduction in weight loss (44.81%). The global price rise of petroleum products and fossil fuel has led scientists to design new strategies for thermal energy regeneration and conservation. The latent heat storage devices (LTHS) prepared from phase change materials (PCMs) are interesting choice for thermal energy storage applications. The LTHS are widely used in several applications such as condensation heat recovery, building energy conservation, temperature regulating textiles and solar energy systems. Many compounds have been used recently for fabricating theLTHS i.e., fatty acids, poly ethylene glycol (PEG), alcohols and mixture of them. Several types of PCMs are available these days such as solid liquid PCMs, solid-solid PCMs and liquid-gas PCMs. Recently polyalcohols have gained significant attention as PCMs. EG is commonly used as solid liquid PCM owing to its excellent properties such as, high latent heat of fusion, suitable melting point,and being chemically inert and stable . Feng et al. had prepared polyethylene glycol/active carbon composites as shape stabilized PCMs. Similarly, neopentyl glycol (NPG) was also investigated as potential.
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