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Effect of particle loading on the stability of the water based iron-oxide nanofluids (Article)

Arifutzzaman, A.[a], Ismail, A.F.[b], Khan, A.A.[c], Alam, M.Z.[d], Saidur, R.[a,e]

[a]Centre for Nano-Materials and Energy Technology (RCNMET), School of Science and Technology, Sunway University, No. 5, Jalan Universiti, Bandar Sunway, Petaling Jaya, Selangor, Darul Ehsan 47500, Malaysia
[b]Department of Mechanical Engineering, Faculty of Engineering, International Islamic University Malaysia (IIUM), P.O. Box 10, Kuala Lumpur, 50728, Malaysia
[c]Department of Manufacturing and Materials Engineering, Faculty of Engineering, International Islamic University Malaysia (IIUM), P.O. Box 10, Kuala Lumpur, 50728, Malaysia
[d]Department of Biotechnology Engineering, Faculty of Engineering, International Islamic University Malaysia (IIUM), P.O. Box 10, Kuala Lumpur, 50728, Malaysia
[e]Department of Engineering, Lancaster University, Lancaster, LA1 4YW, United Kingdom

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Abstract

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Dispersion stability is a crucial challenge for a nanofluid to obtained a uniform dispersion. The main aim of this research is to develop stability monitoring approach by experimental investigation of ultra violet-visible (UV-vis) absorbance of deionized water (DW) based ironoxide (maghemite: MH) nanoparticles dispersed nanofluids (MH/DW). Five different samples were prepared with increasing the loading of MH nanoparticles varied from 0.065 to 0.157 mg/ml in DW. Primarily digital photographs were captured to observed the sedimentation of MH/DW the nanofluids. A method was developed to monitor the quantitative stability of relative concentrations of MH/DW nanofluids. Optical absorbance measurements were conducted using UV-vis absorbance spectroscopy by varying the light wavelength from 200 to 800 nm. Photographs of MH/DW nanofluids after preparation of ~ 25 days shown uniform and there was no precipitation was visible in the suspensions. For a certain loading of MH particle, with the increasing wavelength absorbance was found to be increased. Absorbance peaks were created at wavelength of ~ 360 nm and then decreased monotonically with the increasing wavelength. The relative concentration of the MH/DW nanofluids was declined when increase the precipitation concentration with time due to slight agglomeration. After ~ 600 hours, the minimum and maximum precipitation rates were found ~ 0.27 and ~ 2.5 % for MH/DW nanofluid with the MH concentration of 0.065 and 0.157 mg/ml respectively. Amount of MH nanoparticle loading affects the rate of sedimentations of the produced MH/DW nanofluids. © 2019 SERSC.

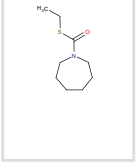
SciVal Topic Prominence

Topic: Nanofluids | Heat Transfer Enhancement | Automobile Radiators

Prominence percentile: 99.944

Chemistry database information

Substances



iron-oxide

iron oxide

Author keywords

Absorbance | Iron oxide | Relative concentration and nanofluid | Stability

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