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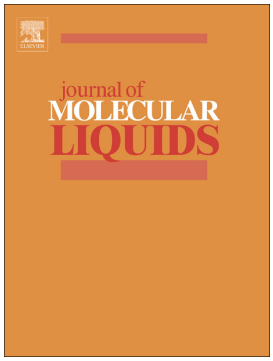

Influence of EFD viscosity on nanofluid forced convection in a cavity with sinusoidal wall

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PII: S0167-7322(16)34213-1
DOI: doi: 10.1016/j.molliq.2017.02.042
Reference: MOLLIQ 6955

To appear in: *Journal of Molecular Liquids*

Received date: 25 December 2016
Revised date: 10 February 2017
Accepted date: 13 February 2017

Please cite this article as: M. Sheikholeslami, Houman B. Rokni , Influence of EFD viscosity on nanofluid forced convection in a cavity with sinusoidal wall. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Molliq(2017), doi: 10.1016/j.molliq.2017.02.042

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Influence of EFD viscosity on nanofluid forced convection in a cavity with sinusoidal wall

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Abstract

Impact of Coulomb force on Fe_3O_4- Ethylene glycol nanofluid convective heat transfer is examined. The positive electrode is considered as moving wall. Control Volume based Finite Element Method is selected to obtain the outputs which are the roles of Reynolds number (Re), nanofluid volume fraction and supplied voltage $(\Delta\varphi)$. EFD viscosity of nanofluid according to experimental data is taken into account. Results reveal that electric field boosts the convention mode so heat transfer rate augments by augmenting Coulomb force. Isotherms become denser near the lid wall with augment of Re and $\Delta\varphi$. Using electric field is more useful for lower Reynolds number.

Keywords: EHD; Nanofluid; Forced convection; EFD viscosity; Joule heating; CVFEM.

Nomenclature

D_e	diffusion number	β	coefficient of

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