

**EXPERIMENTAL INVESTIGATION OF THE EFFECTS OF EXTERNAL ELECTRIC FIELD ON VISCOSITY OF Fe<sub>3</sub>O<sub>4</sub>-EG NANOFLUID**

Eleheh Monajjemi Rarani, Nasrin Etesami and Mohsen Nasr Esfahany  
Isfahan University of Technology  
Chemical Engineering Department  
Isfahan 84156-83111, Iran

**SUMMARY:** Experimental investigations are carried out to measure the viscosity of the magnetic nanofluids in either the absence or the presence of the external electric field. The effects of the volume fraction of the suspended nanoparticles, the external electric field intensity and the type of electric field (AC or DC) on the viscosity of the nanofluid are analyzed. Fe<sub>3</sub>O<sub>4</sub> Nanoparticles used in 0.01, 0.02 and 0.05% volume concentrations in ethylene glycol (EG) as a base fluid. The capillary tube viscometer is used to measure the viscosity of nanofluid. The experimental results show that the viscosity of the magnetic nanofluid decreases by increasing in the nanoparticle concentration and are lower than the value of the base fluid. Applying electric field decreases the viscosity of the magnetic nanofluids and base fluid, generally. The effect of DC electric field on decreasing the viscosity of the magnetic nanofluids is greater than AC electric field, but about the base fluid, the effect of AC electric field is greater.