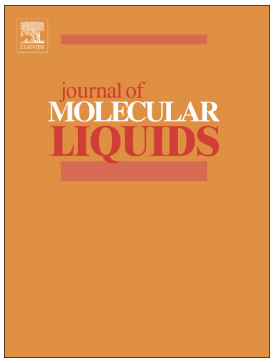

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Comparison of experimental and calculated thermophysical properties of alumina/cupric oxide hybrid nanofluids

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ABSTRACT:

Over the past few decades, nanofluids have emerged as prospective heat transfer fluids. Studies of nanofluids suggest that based on the dispersoids chosen, thermal conductivity and other measures of heat transfer properties could be substantially improved when compared to the conventional fluids (usually used in radiators). The heat transfer rates of nanofluids are highly dependent on properties such as thermal conductivity, density, specific heat, viscosity and chemical stability The emerging field of hybrid nanosystems involves use of two different nanoparticles to improve heat transfer properties. In this study, alumina (Al_2O_3) and cupric oxide (CuO) nanoparticles (made using a simple and scalable process), are used as co-dispersoids in an ethylene glycol-water dispersion medium. The nanoparticles are carefully characterized using electron microscopy and x-ray diffractometric analysis. These nanoparticles (Al_2O_3/CuO) are then dispersed at various volume fractions (0.05, 0.1 and 0.2); the variation of thermophysical properties with temperatures (range: 20 to 70 ºC) are studied. The hybrid nanofluids showed an enhancement of nearly 45% in its thermal conductivity. However thermal conductivity and viscosity trends suggest a definite need to account for interfacial chemical interactions in