Temperature Conductivity of Magnetic Liquids (Rocket Fuel)

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Organometallic compounds with low but observable vapour pressures are interesting for several applications. One of these is the chemical vapour deposition (CVD). Nanofluid is a novel heat transfer fluid prepared by suspending solid nanoparticles in a transitional fluid. The most important feature observed in nanofluids is an abnormal rise in thermal conductivity, for beyond expectations and much higher then any theory could predict [1]. The thermal conductivity of nanofluids is a strongly increasing function of temperature, much more then that of pure liquids and magnetic fuels. The large surface area of nanoparticles allows for more heat transfer. Also, the mobility of the particles attributes to the tiny size, increases heat transfer. The abnormal increase in the thermal conductivity of nanofluids with a rise in temperature may be attributed to the above reasons. Research on the abnormal enhancement of thermal conductivity of nanofluids has been carried out experimentally and theoretically [2]. Magnetic pollution has become a relevant problem for the actual environmental policy, especially for the close connection with human health. Magnetic fields interaction with environment and man is one of the most interesting research fields for the world scientific community. This paper describes a part of a multidisciplinary research effort on the possible effects of magnetic fields on man. Man is always exposed to magnetic fields, which are in the 10-150 kHz range and regard radio and television communications. The investigation was carried out by an experimental facility which was built for exposing thymic cell cultures to RF electromagnetic fields. Thymic cell cultures were chosen because their alterations are generally an index of cancerogenesis. The research studies the temperature conductivity, pressure, specific volume, temperature and concentration (aPVT$_x$data) for, rocket fuel mixtures were measured, at room temperature and pressures, and the concentration ranged from 0 % to 20 %. The experiments have been carried out at concentrations of ferromagnetic materials in the mixtures are (0.5; 1.5; 2.0; 2.5; 3.0)g by mass. The results are processed to find the temperature conductivity equations as the forms of a=f(B), a=f(B,m), a=f(H,m). This is required for a suitable starting up and operations of the engine.

[1] S.Lee, S.U.S.Choi, S.Li, J.A.Eastman, Measuring thermal conductivity of fluids containing oxide nanoparticles.J.Heat Transfer, 121, 280, 1999.
[2] D.Wen, Y.Ding Experimental investigation into convective heat transfer of nanofuids at the entrance region under laminar flow conditions, Int. J. Heat and Mass Transfer 47, 5181, 2004.