

A numerical study on ionic liquids - water mixture based ionanofluid enhanced with alumina nanoparticles



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Abstract:

Encyclopedia Ionic liquids have proven to be one of the most impressive fluid classes due to their specific properties and applications in chemistry and energy engineering. One of the most recent applications of the ionic liquids is the manufacture of ionanofluids. These new materials are a particular type of nanofluid and are defined as a stable dispersion of nanomaterial particles (tubes, rods, spheres) in an ionic liquid. Ionanofluids are an innovative research field also due to the increasing need to identify non-pollutant heat transfer environments while reducing energy consumption. It is clearly demonstrated in the literature that, despite the inconsistent data, substantial increases in the thermal characteristics of this particular type of nanofluids as compared to their basic fluids are unquestionable. However, published data are still limited and scattered, and are insufficient to understand clearly the mechanisms of these new fluids heat transfer. It is therefore impetuous to carry out more comprehensive studies of their heating behavior under different conditions or factors such as: concentration, temperature, pressure, flow conditions, heating systems and flow geometry. The numerical research on ionanofluids it is still at its beginnings. Therefore, some ionanofluids were implemented in several codes to analyze their behavior in heating systems and associated results are very interesting in demonstrating possible uses for heating. In this paper the authors will try to implement some fully described ionanofluids in a numerical code to get information about the ionanofluids behavior in laminar flow conditions. The implemented ionanofluids will be based on a

mixture of water and ionic liquid in three different mole fractions and alumina nanoparticles will be added. Concluding, research on ionanofluids is very important and great efforts are needed to fully describe these new heat transfer fluids and to explore their potential in applications.

Biography

Elena Ionela Chereches is a PhD student in the third year at the Faculty of Materials Science and Engineering, Technical University "Gheorghe Asachi" of Iasi, Romania. Marius Chereches is also a PhD student at the Faculty of Materials Science and Engineering, Technical University "Gheorghe Asachi" of Iasi, Romania. Alina Adriana Minea currently works at the Department of Technologies and Equipments for Materials Processing, Technical University "Gheorghe Asachi" of Iasi. Alina Adriana does research in Industrial Engineering, Materials Engineering and Engineering Physics. Her major current projects are 'Nanouptake_ COST action.' and "NanoRound". Her work is based on numerical and experimental studies in developing new heat transfer fluids as well as heat transfer enhancement techniques for saving energy.

Speaker Publications:

"A numerical approach in describing ionanofluids behavior in laminar and turbulent flow"

"Experimental study on thermophysical properties of alumina nanoparticle enhanced ionic liquids"

"Electrical conductivity of new nanoparticle enhanced fluids: An experimental study"

“Viscosity and isobaric specific heat capacity of alumina nanoparticle enhanced ionic liquids: An experimental approach”

“Experimental evaluation of electrical conductivity of ionanofluids based on water–[C 2 mim][CH 3 SO 3] ionic liquids mixtures and alumina nanoparticles”

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