

## **Characterization and thermophysical properties of rutile and alumina nanofluids**

**J.L. Arjona-Escudero<sup>1\*</sup>, I.M. Santos-Ráez<sup>1</sup>, and A.I. Gómez-Merino<sup>2</sup>**

<sup>1</sup> Department of Mechanics, Thermal and Fluids Engineering, University of Málaga (Spain)

<sup>2</sup> Department of Applied Physics II, University of Málaga (Spain)

\*Corresponding author: [jae@uma.es](mailto:jae@uma.es)

**Keywords:** nanofluids, thermal conductivity, DLS, viscosity.

**Abstract:** The characterization in relation to shape and particle size of alumina and rutile suspensions was performed. The intrinsic viscosity exhibited the presence of non-spherical aggregates in both suspensions although TEM images showed non monodisperse spherical shape of alumina particles. DLS indicated the existence of particle aggregates for both systems. In all cases, the increase in thermal conductivity with respect to the base fluid is verified. The thermal conductivities obtained experimentally were compared with three mathematical models, which yielded lower values than those measured. From rheological measurements and by means of the Peclet number defined in colloidal suspensions, values of thermal conductivity were also proposed.