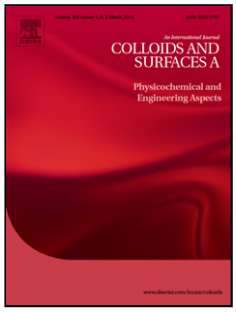

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Entropy generation optimization and unsteady squeezing flow of viscous fluid with five different shapes of nanoparticles

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Abstract

The main objective of this article is to analyze the comparative study of five water base nanofluids. Nanofluids are comprised of Titanium oxide or Titania (TiO_2), Aluminum oxide or Alumina (AL_2O_3), Copper oxide (CuO), Copper (Cu) and Silver (Ag) and water (H_2O). Unsteady flow between two sheets is analyzed. Upper sheet is squeezed towards lower one while lower stretching sheet exhibits porous character. Thermal radiation, applied magnetic field, viscous dissipation and Joule heating effects are accounted. Entropy generation is also evaluated. Second law of thermodynamics is implemented for the entropy generation. Partial differential equations are transformed into ordinary differential equations by transformation procedure. Ordinary differential equations system is numerically solved by NDSolve technique. Influences of flow parameters on velocity, temperature, entropy generation and Bejan number are examined in graphs. Numerical results for skin friction and Nusslt number are tabulated. The obtained results show that velocity decays for larger values of magnetic parameter and porosity while it is enhanced through squeezing parameter. Temperature is an increasing function of Eckert number, magnetic parameter, squeezing parameter and nanoparticles volume fraction. Entropy generation is increased with thermal radiation, Prandtl number, volume fraction and Eckert number.

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