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MHD boundary layer flow, heat and mass transfer analysis over a rotating disk through porous medium saturated by Cu-water and Ag-water nanofluid with chemical reaction

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Abstract
In this article we have presented, magnetohydrodynamic (MHD) boundary layer flow, heat and mass transfer characteristics of Cu-water and Ag-water nanofluid (with volume fraction 1% and 4%) over a rotating disk through porous medium with thermal radiation, chemical reaction and partial slip. Using similarity variables the governing equations which represent the momentum, energy and diffusion are transformed into ordinary differential equations. The transformed conservation equations are solved numerically by using versatile, extensively validated, Finite element method. The sway of significant parameters such as nanoparticle volume fraction parameter (φ), Magnetic parameter (M), velocity slip parameter (λ), porous parameter (k), thermal radiation (R), space-dependent (A) and temperature dependent (B) heat source/sink parameters, temperature slip parameter (ξ), and chemical reaction parameter (Cr) on radial velocity, azimuthal velocity, temperature and concentration evaluations in the boundary layer region are examined in detail and the results are shown in graphically. Furthermore, the effect of these parameters on local skin friction coefficient (Cf), local Nusselt number (Nux) and local Sherwood number (Shx) is also investigated. The results are compared with previously published work and found to be admirable agreement. It is noted that the temperature profiles elevated with the increasing values of nanoparticle volume fraction parameter (φ). © 2016 Elsevier B.V.

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