Mixed Convection Effect on Melting from a Vertical Plate Embedded in Porous Medium with Soret and Dufour Effects

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The present work analyzed the impact of mixed convection on melting from a vertical flat plate embedded in porous medium in the presence of Dufour and Soret effects. The partial differential equations governing the problem under consideration have been transformed by a similarity transformation into a system of ordinary differential equation which is solved numerically by Runge–Kutta–Gill methods. Dimensionless velocity, temperature, and concentration profiles are presented graphically for various values of the Dufour number (Df), Soret number (Sr), melting parameter (M), and buoyancy parameter (Gr/Re). During the investigation, it was found that the melting phenomenon decreases the local Nusselt number and local Sherwood number at the solid–liquid interface. Also, it is interesting to note that the velocity as well as temperature increases while the concentration decreases with an increase in the Dufour number Df (or simultaneous decrease in the Soret number Sr). © 2013 Wiley Periodicals, Inc. Heat Trans Asian Res Online Library (wileyonlinelibrary.com/journal/htj). DOI 10.1002/htj.21113