Abstract

The effect of a radial magnetic field on separation of a binary mixture of incompressible viscous thermally and electrically conducting fluids confined between two concentric cylinders in which the inner is rotating with a uniform angular velocity and having a uniform suction of the mixture with a constant velocity and outer is at rest. The equations governing the motion, temperature and concentration in cylindrical polar co-ordinate are solved analytically. The solution obtained in closed form for concentration distribution is plotted against the radial distances from the surface of the inner cylinder for various values of non-dimensional parameters viz. The Hartmann number, thermal diffusion number, baro diffusion number, suction Reynolds number, the product of Pradtl number and Eckert number, the product of Schmidt number and suction Reynolds number and the suction parameters affects the species separation of rarer and lighter component significantly.
Effect of Radial Magnetic Field and Temperature Gradient on Separation of Components of a Binary Fluid Mixture

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Index Terms

Computer Science

Applied Sciences

Keywords

Binary mixture incompressible fluid thermal diffusion baro diffusion magnetic field
Effect of Radial Magnetic Field and Temperature Gradient on Separation of Components of a Binary Fluid