Abstract

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numerical simulation of double diffusive laminar mixed convection in a horizontal annulus with hot, solutalrotating inner cylinder" international journal of thermal sciences vol. (46) no. 7, pp 637-648, (2007)

a numerical investigation of double-diffusive laminar mixed convection within a two-dimensional, horizontal annulus has been carried out.the inner cylinder was considered to rotate in an anti-clockwise direction to introduce the forced convection effect. in addition, the solutalrnand thermal buoyancy forces are sustained by maintaining the innerouter cylinders at uniform temperaturesconcentrations, but theirrnvalues for the inner are higher than the outer. the laminar flow regime is considered under steady state conditions. moreover, the transportrnequations for continuity, momentum, energymass transfer are solved using the patankar–spalding technique. the streamlines, isothermsrnand isoconcentrations as well as both localaverage nusseltsherwood numbers were studied. the study covers a wide range for 102 rnrat 106, 0.1 le 10?20 n 20. through this investigation, the following parameters are kept constant: prandtl number at 0.7,rnthe rotational reynolds number at 100the radius ratio at 0.5. the predicted results for both average nusseltsherwood numbers wererncorrelated in terms of lewis number, thermal rayleigh numberbuoyancy ratio. a comparison was made with the published resultsa goodrnagreement was found.