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Combined thermophoresis and Brownian motion effects on nanofluid free convection heat transfer in an L-shaped enclosure

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Abstract

In this study, natural convection heat transfer in an L-shaped enclosure filled with a nanofluid is studied. The numerical investigation is carried out using Control Volume based Finite Element Method (CVFEM). The important effects of Brownian motion and thermophoresis have been included in the model of the nanofluid. Comparisons with previously published works are conducted and the results are found to be in good agreement. The influence of pertinent parameters such as the Lewis number, aspect ratio, thermal Rayleigh number and the concentration Rayleigh number on the flow, heat transfer and Nusselt number are illustrated graphically and discussed. Results show that the Nusselt number increases with increases in either of the thermal Rayleigh number and the Lewis number but it decreases with increases in either of the aspect ratio and the concentration Rayleigh number. © 2017 The Physical Society of the Republic of China (Taiwan)

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