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Analysis of heat transfer in a closed cavity ventilated inside

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In this work, we presented a numerical study of the phenomenon of heat transfer through the laminar, incompressible and steady mixed convection in a closed square cavity with the left vertical wall of the cavity subjected to a warm temperature, while the right wall is considered to be cold. The horizontal walls are assumed adiabatic. The governing equations were discretized by finite volume method on a staggered mesh and the SIMPLER algorithm was used for the treatment of velocity-pressure coupling. The numerical simulations were performed for a wide range of Reynolds numbers 1, 10, 100 and 1000 numbers are equal to 0.01, 0.1 Richardson, 0.5, 1 and 10.The analysis of the results shows a bicellular flow (two cells), one is created by the speed of the fan placed in the inner cavity and one on the left is due to the difference between the temperatures of right wall and the left wall. Knowledge of the intensity of each of these cells allowed us to get an original result. And the values obtained from each of Nusselt convection which allows knowing the rate of heat transfer in the cavity. Finally, we found that there is a significant influence on the position of the fan on the heat transfer (Nusselt evolution) for values of Reynolds study and for low values of Richardson study. This influence is negligible for high values of the latter.

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The aqueous phase behavior of linear alkylbenzene sulphonate/polycarboxylate polymer systems

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Linear alkylbenzene sulphonate (NaLAS) surfactant, used in detergent products, is often combined with polycarboxylate polymers that act as anti-redeposition agents and viscosity modifiers. This work investigates the interaction of the polymer and surfactant in an aqueous system via a NaLAS-polyacrylate-water phase diagram at 50ºC. It shows the multiple effects the depletion flocculation phenomena have depending upon the region of the phase diagram being considered. 2H-NMR shows that the sizes of the multilamellar vesicle structures increase with polymer concentration. This is the first time that 2H-NMR has been used to probe the diffusion and anisotropy of D2O within the bilayers of the vesicles for such a system. The phase diagram, shown below, presents a micellar region at surfactant concentrations of up to 35 wt% NaLAS and a lamellar phase plus micellar region at higher concentrations, consistent with previous observations by Stewart1 and Richards2. As polymer is added at low surfactant concentrations, between 10 and 20 wt% NaLAS, a non-birefringent phase is observed; perhaps a polymer rich phase resulting from depletion flocculation. At high surfactant concentrations, a second lamellar phase is also induced, different in bulk density from the original, again likely resulting from depletion flocculation of multilamellar vesicles. 2H-NMR was used to determine an increase in average multilamellar vesicle size as a function of polymer concentration. The mechanism causing this is likely a result of vesicle fusion resulting from depletion flocculation caused by polymer addition, as initially described by van de Pas[3].

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