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# ON THE MEASUREMENTS OF HIGH TEMPERATURE BINARY INTERDIFFUSION COEFFICIENTS UNDER THE ACTION OF NON-INERTIAL ISS ACCELERATIONS

**Abstract**

Regarding a reference frame attached to a generic diffusion experiment located inside the Columbus module of the International Space Station ISS, the flow of a binary solution (supposed Newtonian and incompressible) should be properly studied considering the contribution of the Coriolis, Euler and centrifuge accelerations in the corresponding Navier-Stokes momentum equations. The objective of this point of view is to take into account the impact of the ISS angular movements on the experiment results. In addition, due to the large isothermal furnaces typically used in this kind of experiments, we consider reasonable enough to introduce only solutal convection (Fick's law). Because the isothermal condition, no thermodiffusion effects have been considered in the solutal calculations. All these previous consideration means that the computational domain should be now a three-dimensional cylindrical one. So, extending our recently published two-dimensional specific techniques [1, 2] a scalar percentage indicator Preliminary results indicate that, in both kinds of mixtures, the interdiffusion configuration is sensitive to the environmental conditions. But, this configuration gives the highest quantitative value of the indicator if compared with the so-called centered or lateral thick layer ones. All these results agree qualitatively well with recently reported conclusions using our simpler two-dimensional computational model [1, 2].

[1] X. Ruiz, J. Pallarés, F.X. Grau, On the accuracy of the interdiffusion measurements at low and moderate solutal Rayleigh numbers. Some computational considerations, International Journal of Heat and Mass Transfer, 53 (2010) 3708-3720.

[2] X. Ruiz, J. Pallarés, On the accuracy of the diffusion coefficient measurements using different initial shear cell configurations at low and moderate Rayleigh numbers. Some computational considerations, International Journal of Heat and Mass Transfer, 2012 (Submitted).