10th International Meeting on Thermodiffusion

Foreword

This topical issue of *Comptes rendus Mecanique* deals with mass transport effects driven by thermal gradients. In simple fluid mixtures, coupling of heat and mass diffusion is due to the Ludwig–Soret effect, also known as thermal diffusion. In ternary mixtures, diffusive transport of a particular constituent results not only in concentration gradients of the component (main distribution), but also in concentration gradients of all other components of the mixture (cross diffusion) and temperature gradients. Recent advances in finding some intrinsic rules governing behaviour of mixtures on the basis of properties of single components, e.g. thermophobicity, excite even more interest in such studies, with the ambitious goal of expanding this regularity from binary equimolar compositions to the whole concentration coverage for certain classes of ternary mixtures.

This renewed interest in Soret-related phenomena is mirrored by the set of diverse articles that appear in the present issue. These papers have been presented at the International Meeting IMT10 held at the Université libre de Bruxelles (ULB), Belgium, on 4–8 June 2012. The conference was organized by the Microgravity Research Center, ULB.

The contributions of the participants of the IMT10 cover a broad area of research in the field of thermodiffusion, both from the fundamental and applied point of views. Thus, this compilation of selected articles gives an overview, from theory to experiments, of the current state-of-the-art in thermodiffusion and related phenomena research. They include, among others:

- thermodynamics and statistical mechanics of fluids in thermal gradients,
- thermophoresis in macromolecular solutions, airborne particles, colloidal suspensions, and biological fluids,
- thermodiffusion in porous media and enhanced oil recovery,
- hydrodynamic instabilities and convective patterns induced by the Soret effect,
- non-equilibrium fluctuations in thermally inhomogeneous fluids,
- thermal diffusion effects in crystal growth and polymer processing,
- thermal diffusion in microgravity,
- thermal diffusion in biological transport,
- towards ternary mixtures: experimental aspects, theory and numerical methods in thermodiffusion.

Guest Editors

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