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## Foreword

Colloid and Interface Science is a fast growing area of science. Nowadays it is frequently referred to as “Nanoscience”, which is actually a special part of Colloid and Interface Science (see, for example, a recently published book “Nanoscience: Colloidal and Interfacial Aspects”, Ed. V. Starov. Surfactant Science Series, Volume 147, CFRC Press, Taylor&Francis Group). Colloid and Interface science methods penetrates into a number of “neighbouring” areas such as membrane separation, biology, medicine to name only a few.

The current Special Issue is devoted to the current state of art in membrane separation with a particular emphasis on its relation to Colloid and Interface Science. Those relations have a long history. If a colloid and interface scientist attends Membrane Science conferences he/she will be very much pleased to hear that colloid and interface science penetrates Membrane Separation quite deeply. In particular, DLVO theory is as frequently mentioned at those meetings as at Colloid and Interface Science meetings.

In this respect we would like to honour Professor W. Richard Bowen, who contributed enormously to the interrelation between membrane separation and colloid and interface science. He pioneered in application of colloid and interface science methods to membrane separation and he was the first to use DLVO theory for both qualitative and quantitative predictions of phenomena in membrane separation and to quantitative design of membrane processes.

Professor Bowen is a Fellow of the UK Royal Academy of Engineering, he was the Founding Director of the Centre for Complex Fluids Processing, combining world-leading research with extensive industrial interactions, at Swansea University in the United Kingdom, and was instrumental in founding the Multidisciplinary Nanotechnology Centre at the same institution. Professor Bowen has also been Vice-President of the European Membrane Society from 2000-2002. He has made outstanding contributions to the understanding and application of advanced separation processes, especially membrane processes, surfaces and colloids.

The purpose of the current Special Issue is two folds: (i) to present a current state of art of research in membrane separation area and (2) to revive the interest of colloid and interface science community to the area. It is probably worth mentioning that according to UN estimates, the total amount of water on earth is about 1,400 million km<sup>3</sup> However, only 0.06% of that amount is effectively available for consumption and other uses in rivers, lakes, and ground water:

- Drinking and sanitation require approximately 10 % of the fresh water supplies
- Industry, recreation, and other uses comprise about 20 %
- Irrigation, which accounts for 70 % of all the water extracted from rivers, lakes, and aquifers, is by far the most intensive use of the world's fresh water resources

Water treatment is largely based on colloid and interface science methods. Annually around 100 billion US dollars are invested into water treatment and desalination. However, huge areas on Earth suffer from water shortages.

In this Special Issue 11 contributions from scientists in the area of membrane separation and colloid science are published. However, there are some papers published earlier, which nicely fit into scope of this Special Issue

**Victor Kochkodan, Nidal Hilal, Volodimir Melnik, Olga Kochkodan, Olexandr Vasilenko.** Selective recognition of organic pollutants in aqueous solutions with composite imprinted membranes. *Advances in Colloid and Interface Science*, Volume 159, Issue 2, 2010, 180-188

**Victor V. Nikonenko, Natalia D. Pismenskaya, Elena I. Belova, Philippe Sizat, Patrice Huguet, Gérald Pourcelly, and Christian Larchet.** Intensive current transfer in membrane systems: modelling, mechanisms and application in electrodialysis. *Advances in Colloid and Interface Science*, Volume 160, Issues 1-2, 2010, 101-123

**Nataliya A. Mishchuk.** Concentration Polarization of Interface and Nonlinear Electrokinetic Phenomena. *Advances in Colloid and Interface Science*, Volume 160, Issues 1-2, 2010, 16-39

**Isaak Rubinstein, Boris Zaltzman** Extended Space Charge in Concentration Polarization. *Advances in Colloid and Interface Science*, Volume 159, Issue 2, 2010, 117-129

**Mahsa M. Rohani and Andrew L. Zydney.** Role of Electrostatic Interactions during Protein Ultrafiltration. *Advances in Colloid and Interface Science*, Volume 160, Issues 1-2, 2010, 40-48

**Marek Bryjak, Irena Gancarz, Katarzyna Smolinska.** Plasma nanostructuring of porous polymer membranes. *Advances in Colloid and Interface Science*, Volume 161, Issues 1-2, 2010, 2-9

We hope that the current Special Issue (coupled with the mentioned above already published papers) will make current state of art in the membrane separation research available for all colloid and interface scientists and will attract the proper attention of this community to the membrane separation research: fast growing area of research with enormous potentials in the future.

**Guest Editors**

Professor Nidal Hilal, UK

Professor Victor M. Starov, UK