Solubility Phenomena

by Dewen Zeng

The 15th International Symposium on Solubility Phenomena and Related Equilibrium Processes was held 23–27 July 2012 at Qinghai Institute of Salt Lakes, Chinese Academy of Sciences, Xining, China. This IUPAC-sponsored symposium included a workshop entitled “Solubility and Other Equilibria in Salt Brines.”

The 11th Annual Meeting of the Subcommittee on Solubility & Equilibrium Data (SSED) of the IUPAC Analytical Chemistry Division met on 21 July, chaired by Clara Magalhães from Portugal.

Over 100 participants, including accompanying persons, from 21 countries attended the annual meeting of SSED and the symposium: Australia, Austria, Canada, China, Czech Republic, Denmark, Finland, Germany, Hungary, India, Ireland, Italy, Japan, Nepal, Poland, Portugal, Russia, Slovakia, Ukraine, and USA.

The opening ceremony was chaired by Dewen Zeng from the Qinghai Institute of Salt Lakes, Chinese Academy of Sciences. Attendees were welcomed by Yunlong Gao, the vice governor of Qinghai Province, and Haizhou Ma, director of QISL. Heinz Gamsjäger, as IUPAC representative, gave a speech titled “IUPAC Advancing Progress in Chemistry.” Clara Magalhães, the chair of SSED, contributed a speech on “IUPAC Solubility Data Project (1972–2012).”

Seven plenary and four invited lectures focused on the six aspects related to solubility phenomena: 1) equilibria related to solid solutions; 2) computer-assisted equilibrium calculations; 3) solubility features in ionic liquids; 4) kinetics of phase transformations; 5) effects of solute-solvent interactions on solubility phenomena; and 6) solubility phenomena related to brine solution.

Heinz Gamsjäger (Austria) delivered the opening plenary address on “Solubility Phenomena in Science and Education—Experiments, Thermodynamic Analyses, and Theoretical Aspects,” which focused mainly on experimental and theoretical aspects of sparingly soluble solids-aqueous solutions equilibria. The other keynote lectures were as follows:

- Solid-Solute Phase Equilibria in Aqueous Solution—Fundamentals and Application (E. Königsberger, Australia)
- The Highs and Lows (and in-betweens) of Solubility Measurements of Electrolytes (G. Hefter, Australia)
- Solid Phase Equilibria in Ionic Liquids-Crystallization Phenomena (A. Koenig, Germany)
- Modeling of the Solubility of Inorganic Compounds in Multicomponent Process Solutions over Wide Temperature Ranges (V. Papangelakis, Canada)
- Phase Behavior and Intermolecular Interaction of Green Solvent Systems (B. Han, China)
- Solubility Phenomena Study Concerning Brines in China (P. Song, China)
- Solubility Phenomena Related to CO2 Capture and Storage (A. De Visscher, Canada)
- Solid Solutions of Layered Oxides with Rare Earth Elements (I. Zvereva, Russia)
- Modeling Mixed Solvent Electrolyte Systems: Phase Behavior, Chemical Equilibria, and Transport Properties (P. Wang, USA)
- Investigation of Radionuclide Solubility and Speciation in Concentrated Salt Brine Solutions (M. Altmaier, Germany)

The authors of the keynote lectures have been invited to submit their papers to Pure and Applied Chemistry.
Julia Schmitt was honored with the 2012 Franzosini award. For more details, see article in the Wire section.

Thirty-three short communications and fifty-three posters were presented during afternoon and morning sessions.

IUPAC poster prizes were given to Christiane Bube (Karlsruhe Institute of Technology, Karlsruhe, Germany) on behalf of the team, for the poster “Thermodynamics of Magnesium Carbonate Phases in Dilute to Concentrated Magnesium Chloride Solutions at 25 °C”; Lijiang Guo (Institute of Salt Lakes, Chinese Academy of Sciences, Xining, China) on behalf of the team, for the poster “Thermodynamic Understanding on the Liquid-Solid Equilibrium of the Ternary System CaCl₂-SrCl₂-H₂O”; and Qiaoling Chen (Institute of Salt Lakes, Chinese Academy of Sciences, Xining, China) on behalf of the team, for the poster “Species Distribution and Physicochemical Properties in Aqueous Magnesium Borate Solutions at 298.15 K.” The high quality of the work presented in the poster session made it very difficult to select only three posters. After analysis of all the posters under different criteria, the jury arrived at the conclusion that five posters qualified for the third poster prize. In addition to Qiaoling Chen’s these were the posters presented by Bin Hu, Hongxia Li, Wenlei Wang, and Hongyan Zhou. The names of the presenters were announced at the banquet and received enthusiastic cheers of the audience.

Sponsorship was provided by the Chinese Academy of Sciences, National Nature Science Foundation of China, Qinghai Foreign Experts Bureau, and the Qinghai Institute of Salt Lakes. The Local Organizing Committee provided financial support to 24 delegates to enable them to attend the meeting.

A Chinese style banquet was served to participants. During the banquet, a special program was organized to celebrate the 80th birthday of Heinz Gamsjäger. Clara Magalhães chaired the session. Glenn Hefter introduced the curriculum vitae of Gamsjäger and his achievements in solubility phenomena research and in chairing the SSED of IUPAC. The Local Organizing Committee presented Gamsjäger with a special Chinese birthday gift “Tang suit” and wished him good health and a long life.

The 16th ISSP will be held in July 2014 in Karlsruhe, Germany.

Dewen Zeng <dewen_zeng@hotmail.com> was co-chair of the symposium; he is a professor working with Qinghai Institute of Salt Lakes and College of Chemistry and Chemical Engineering, Central South University in China. He is a member of the SSED. Input to this report was also provided by Clara Magalhães and Heinz Gamsjäger.