Chemical Engineering Journal 147 (2009) 1

Contents lists available at ScienceDirect

Chemical Engineering Journal

journal homepage: www.elsevier.com/locate/cej

Foreword

The recent renaissance of ionic liquids, or low-melting molten salts, represents a major contemporary milestone in chemical technology. As a group, ionic liquids frequently possess some or all of the following peculiarities: non-volatility, ample electrochemical stability, extreme thermal stability (for a semi-organic solvent), property designability. Of course, it is this latter property that affords ionic liquids their "task-specific" nature as well as making possible the intentional (or inadvertent) devising of ionic liquids with properties distinctly contrary to their "green" folklore. Following heavy initial emphasis as reaction and separations media, as we fast-forward to the present day, ionic liquids are now beginning to permeate nearly every major branch of chemical enterprise. The enthusiasm of the research community in this area is evident not only from the supra-exponential growth in the number of papers published during the first years of the twenty-first century, but also by the influx of established researchers from dissimilar backgrounds and, overwhelmingly, how these novel fluids are opening new pathways and reinventing approaches in chemical analysis, materials science, (bio)catalysis, electrochemical devices, and reaction engineering.

It is interesting to look at early predictions and to find that reality has overtaken imagination in many cases. Already, however, we are reaching a bottleneck in terms of the designer attribute of ionic liquids. Happily, this is being more than compensated by a deeper understanding of these remarkable fluids, as well as more serious consideration given for their potential to address real-world needs. It is also exhilarating to see that in select areas, cutting-edge advances offered by ionic liquids are demanding a paradigm shift in approach. Clearly, the field has gone beyond a purely exploratory phase: *no longer are ionic liquids confined to the role of laboratory curiosity*, although we hope they retain some of that allure as well. Another benefit of a field slowly maturing out of its infancy is the spate of papers correcting the false assumptions or naïve oversights and misconceptions around which some early work was centered. As these gaps in knowledge are progressively bridged and the ionic liquid community becomes more well informed and discerning, so expands the collective utility of these fluids into wider-ranging fields of exploration.

This diversity, echoed in the papers selected for inclusion in this special issue of the *Chemical Engineering Journal*, points to the pluridisciplinary nature of the field. Within this issue, we enjoy contributions from recognized groups as well as future leaders in the field on diverse topics including long-chained alkylimidazolium ionic liquids as phase change materials, galvano-static electrodeposition of aluminum on steel, ionic liquids as solvents for cellulose processing and derivatization, solvatochromic probing of ionic liquid/organic solvent mixtures, gas separations in ammonium and fluoroalkyl-functionalized ionic liquids, neutron studies of proteins in ionic liquid solutions, and the morphologically controlled synthesis of iron oxides in ionic liquids.

This special mini-issue, devoted to the latest achievements and inroads for ionic liquid technology from an engineering perspective, was made possible by the efforts of many. We express our deep gratitude to the contributing authors, the selfless and devoted referees, and to Elsevier. It is our earnest hope that this small sampling of papers goes beyond simply providing a snapshot of the current activity in the field, but foremost that it stimulates others to begin thinking about how ionic liquids might make meaningful contributions within their own research (thinking outside the flask!). With sustained investigation, it is our staunch belief that ionic liquids will play decisive roles in important engineering sectors in the future, ranging from environmental monitoring to the generation, processing, and storage of sustainable energy.

Gary A. Baker [a,*]
Jianji Wang [b,*]
Maohong Fan [c]
Laurence R. Weatherley [d]
[a] *Oak Ridge National Laboratory, USA*
[b] *Henan Normal University, China*
[c] *University of Wyoming, USA*
[d] *University of Kansas, USA*

* Corresponding authors.
E-mail addresses: bakerga1@ornl.gov (G.A. Baker), jwang@henannu.edu.cn (J. Wang), mfan@uwyo.edu (M. Fan), lweather@ku.edu (L.R. Weatherley)

1385-8947/$ – see front matter. Published by Elsevier B.V.
doi:10.1016/j.cej.2008.11.008