Journal of Mining and Metallurgy, 39 (1–2) B (2003)

Editorial for the special issue

ELECTRODEPOSITION AND ELECTROCHEMICAL SYNTHESIS FROM IONIC LIQUIDS AND MOLTEN SALTS

Metallurgists apply electrochemical technologies mainly to deposit bulk metals from electrolytes. For example, aquous electrolytes are applied for bulk production of copper. When electronegative metals are to be produced, molten salts are used, such as the cryolite-alumina melt for depositing liquid aluminum by the Hall-Heroult technology. However, traditional molten salts have high melting points, leading to high energy consumption and increased pollution. Therefore, an interest in a relatively new class of materials – room temperature ionic liquids – is constantly increasing. Ionic liquids have the same main advantage as molten salts, wide electrochemical window for depositing electronegative metals, but due to their low melting point and stability against evaporation they seem to be the electrochemical media of the future. That is why, the first chapter of this special issue presents papers, published in the field of electrochemistry from ionic liquids.

For the last decades, electrochemical materials science and engineering is gradually replacing the traditional electrodeposition of bulk primary metals. It appeares to be possible to produce not only alloys, but also intermetallic and other compounds by the co-deposition of two or more components in-situ on an inert, or reactive cathode. In this way coatings, or powders can be routinly produced. In room temperature ionic liquids, also nano-sized materials and thin films can be in-situ electrodeposited.

The publications of this scientific community appear wide-spread in more than a dozen of journals, the exceptions being conference proceedings. It is probably the first time that a special issue of a regular journal is devoted to the sepcial problem of “Electrodeposition and Electrochemical Synthesis from Ionic Liquids and Molten Salts”. There are altogether 28 papers in this issue, 6 papers on ionic liquids, 21 papers on molten salts and 1 paper of common interest. The electrodeposited materials range from pure metals to their alloys, intermetallic compounds and compounds of metals with non-metals, such as borides, carbides, silicides, nitrides and hydrides. A special chapter is devoted to the possibility to

produce carbon nanotubes from molten salts, by electrodepositing and intercalating alkali or alkali earth metals from their molten halides on the graphite electrode.

The guest editor would like to thank all the authors who devoted some of their precious time to contribute to the success of this special issue. In addition to regular readers, this special issue will be sent to more than 50 laboratories all over the world, in which this subject is actively studied. I hope that this volume will be frequently referred by the molten salt and ionic liquid community, and also will be an interesting collection of papers for the regular readers of this journal.

Special thanks goes to dr. Dragana Zivkovic and to my PhD student, Jaroslav Sytchev, without whose special effort this volume would not become a reality.

Miskolc, Hungary, April 2003

George Kaptay, Guest Editor