

PREFACE

This issue brings the reader a selection of papers presented at the Conference "Advanced Materials and Processes" held in Cracow, Poland, 3 - 4 June, 1993. The Conference was organized by the Polish Ceramic Society and the Department of Material Science and Ceramics at the University of Mining and Metallurgy in Cracow.

The papers deal with the specific phenomena occurring in the structure of solids at elevated temperatures. Considered among others are the phenomena of the reconstitution of internal structure of solids accompanied by the redistribution of its chemical components with increasing temperature. They bring about the amorphization of the primary structure and next induce multistage crystallization. The thermodynamic properties of the ionic conductors from the CaO-SiO₂ system are also considered.

The defects of the structure of solids, of non-stoichiometric crystals in particular, are responsible for the electrical and for many other properties of the materials including, on the one hand, the electrical superconductivity, and, on the other hand, the catalytical properties. These problems are dealt with in two papers, one discussing the defect structure of highly non-stoichiometric compounds and its determination, and the other one – the electronic transport in highly non-stoichiometric systems.

The mechanisms of high temperature sulfidation and oxidation of certain alloys and the effect of yttrium admixtures on these mechanisms form the subject of two papers.

These studies illustrate how many apparently different phenomena take place in solid bodies. The scientific workers dealing with these phenomena apply various investigation methods and specific theoretical approaches.

The research work on solid bodies focuses attention on one of these phenomena, trying to explain it by using the respective reasoning and argumentation. However, matter is unique and the occurring phenomena are related to each other. The present collections of problems discussed in the papers helps us to become aware of the above truth.

L. Stoch
President of the Conference