

Chemical Solution Deposition of Functional Oxide Thin Films

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Preface

Chemical solution deposition (CSD) has emerged as a mature technique for the fabrication of functional oxide thin films due to a number of advantages. While the development of sol–gel type CSD processes for optical coatings of glass dates from the mid-twentieth century, the first chemical solution-deposited complex electronic oxide thin films were prepared only as recently as the 1980s. Since the initial studies, a wide variety of perovskite-related and other compounds on various types of substrates have been prepared as thin films with CSD techniques. Substantial progress in the understanding of the processes has been made which enables the fabrication of device quality films by CSD methods nowadays. Various symposia of the Materials Research Society on solution-based materials fabrication, workshops, and conferences have been held and a number of more or less comprehensive review articles and book chapters have been published on this topic. The whole diversification, however, is barely represented in the above-mentioned reviews and a comprehensive textbook on the CSD technology has not been available up to now.

The aim of the book is to comprise the experience of the last 25 years on CSD of mainly electroceramic thin films, with some extensions, as well as CSD-related application areas into a text and reference book. The content is written on a level that should be comprehensible for Material Science students in their third year. So, all the basic chemistry and physics knowledge for typical Material Science curricula should be present.

With the unexpected death of Prof. Fred Lange, author of Chap. 16, and Prof. Marija Kosec, coeditor and coauthor of several book chapters, during the work on this monograph, the community unfortunately lost two outstanding researcher personalities. While Lange was a pioneer in growing epitaxial films by CSD methods, Kosec's CSD-related work was dedicated to the understanding of complicated reactions during solution synthesis and how to control these reactions with regard to ferroelectric thin film preparation. She was always enthusiastically promoting the field of CSD processing in the materials science community. In this sense she was also an avid supporter of the European Union's program for Cooperation in Science and Technology (COST).

The editors would like to thank their 54 authors for their excellent contributions, for a wonderful communication over many years, for their willingness to adopt our ideas for modifications, and for their perseverance. Moreover the editors would like to thank Dagmar Leisten and Thomas Pössinger from IWE II, RWTH Aachen University, for their huge effort and expertly drawing, retracing, optimizing, and generation of most of the artwork of this book. They did an excellent job in creating printable figures from nonoptimal submissions and did their best to get the figures to a more uniform style. One of the editors, (TS), would also like to thank his wife and his children for their patience and understanding during the work on this book project.

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Aachen, Germany
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