

G. Blasse · B. C. Grabmaier

LUMINESCENT MATERIALS

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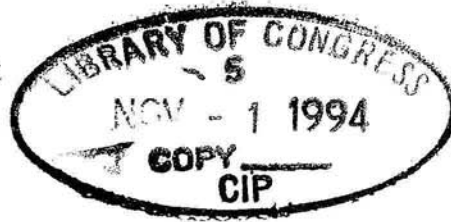
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Luminescent Materials

With 171 Figures and 31 Tables

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Preface

Luminescence is just as fascinating and luminescent materials (are) just as important as the number of books on these topics are rare. We have met many beginners in these fields who have asked for a book introducing them to luminescence and its applications, without knowing the appropriate answer. Some very useful books are completely out of date, like the first ones from the late 1940s by Kröger, Leverenz and Pringsheim. Also those edited by Goldberg (1966) and Riehl (1971) can no longer be recommended as up-to-date introductions.

In the last decade a few books of excellent quality have appeared, but none of these can be considered as being a general introduction. Actually, we realize that it is very difficult to produce such a text in view of the multidisciplinary character of the field. Solid state physics, molecular spectroscopy, ligand field theory, inorganic chemistry, solid state and materials chemistry all have to be blended in the correct proportion.

Some authors have tried to obtain this mixture by producing multi-authored books consisting of chapters written by the specialists. We have undertaken the difficult task of producing a book based on our knowledge and experience, but written by one hand. All the disadvantages of such an approach have become clear to us. The way in which these were solved will probably not satisfy everybody. However, if this book inspires some of the investigators just entering this field, and if it teaches him or her how to find his way in research, our main aim will have been achieved.

The book consists of three parts, although this may not be clear from the table of contents. The first part (chapter 1) is a very general introduction to luminescence and luminescent materials for those who have no knowledge of this field at all. The second part (chapters 2-5) gives an overview of the theory. After bringing the luminescent center in the excited state (chapter 2: absorption), we follow the several possibilities of returning to the ground state (chapter 3: radiative return; chapter 4: nonradiative return; chapter 5: energy transfer and migration). The approach is kept as simple as possible. For extensive and mathematical treatments the reader should consult other books.

Part three consists of five chapters in which many of the applications are discussed, viz. lighting (chapter 6), cathode-ray tubes (chapter 7), X-ray phosphors and scintillators (chapters 8 and 9), and several other applications (chapter 10). These chapters discuss the luminescent materials which have been, are or may be used in the applications concerned. Their performance is discussed in terms of the theoretical models presented in earlier chapters. In addition, the principles of the application and the preparation of the materials are dealt with briefly. Appendices on some, often not-well-understood, issues follow (nomenclature, spectral units, literature, emission spectra).

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