FOREWORD

The relative importance of oxides in the field of materials science has been spectacularly increasing during the last twenty years. First the study of ferroelectrics kept the attention of scientists. Nevertheless this domain is far from being worked out and a lot of new results and of new fields of interest were recently discovered. Other ferroic oxides, especially ferroelastics, have also been the subject of a very great number of new results. In these cases the properties of oxides are at room temperature very tightly related to the phase transition that is generally occurring a few hundred of degrees above this room temperature. In many other cases also properties of oxides can be related to the existence of a phase transition or to a rather similar phenomenon.

This book has been specially devoted to the study of the properties of oxides which are in some way related to the existence of a phase transition. The first chapters are focussed on general considerations: the first one is devoted to a general study of phase transitions, the second one to the twinning phenomenon which is of special interest for many oxides. Chapters 3 and 4 are focussed on ferroelectric and ferroelastic materials. These four chapters constitute the first part of the book. Chapters 5 to 8 are devoted to the study of oxides of special interest which have some of their properties related to a phase transition or to a rather similar phenomenon: rare earth oxides, oxides with a diffuse phase transition, zirconia and alumina systems, tungsten oxides and their relatives. These four chapters constitute the second part of the book.

It has not been possible to consider all the types of oxides having some properties that can be related to a phase transition, for example: quartz, vanadium oxides, superconductors and so on. In all these cases the domain has been evoluting very quickly in the last few years. It could be treated later independently.

Each subject has been treated with a double concern: first to be understandable by any scientist who is not a specialist of the domain or by any student beginning a research work in that field; second to be done at the level of the present state of the research. Finally this book should be useful as well for students or scientists who are interested in the properties of oxides.

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