

Preface

In the broad sense the subject of this book belongs to the Physics of Minerals and Planetary Sciences, namely to the cathodoluminescence spectroscopy and microscopy. This technique enables us to receive new data, which contribute greatly to our fundamental knowledge of planets and may be practically used as an *in-situ* Planetary Cathodoluminescence Spectroscopy for the planetary exploration robotic missions in the near future.

This book is addressed to graduate students, professors and scientists in physics, microbiology, chemistry, earth and planetary sciences, materials science and engineering. It discusses cathodoluminescence microscopy and spectroscopy of planetary materials such as shock-metamorphosed rocks and minerals from terrestrial impact structures as well as Lunar and Martian samples.

The book should be divided into seven chapters. The first chapter contains the basic definitions of cathodoluminescence. Its application in the geosciences is also shortly described. The second chapter describes fundamentals of shock metamorphism as a leading geological process on surface of the planetary bodies. The following chapter deals with a cathodoluminescence microcharacterization of shock metamorphic rocks from terrestrial impact craters. The fourth chapter gives an overview of the impact diamonds and their CL properties. The fifth chapter provides details on the Lunar samples and their mineralogical and geological consequences. The sixth chapter describes the potential of CL instrumentation on the in-situ analysis of the Martian sediments. The last chapter contains a systematic CL study of Mn carbonates, which can aid to understand about the ancient life forms of Earth or Mars.

The editor of this book is highly appreciated because this book represents a fruitful international collaboration between scientists from Canada, France, Germany, Hungary, Italy, Japan, and Switzerland.

Cathodoluminescence and its Application in the
Planetary Sciences

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