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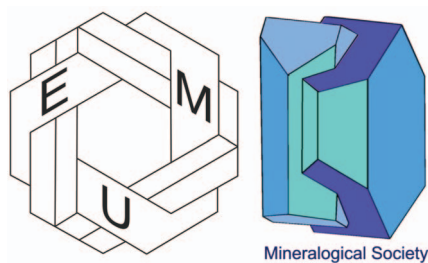
Volume 20

**THE CONTRIBUTION OF
MINERALOGY TO CULTURAL
HERITAGE**

UNIVERSITY TEXTBOOK

Edited by

GILBERTO ARTIOLI and ROBERTA OBERTI



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On the front cover: Egyptian faience was coloured by Cu to reproduce turquoise minerals, or by Co to reproduce lapis lazuli. Here a specimen of lapis lazuli from the classical localities in the Badakshan Province, Afghanistan is related to a faience cat from Egypt, 26th Dynasty (cat image courtesy of Sadigh Gallery Ancient Art Inc., New York).

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Preface

Mineralogy and its companion discipline, crystallography, are fundamental sciences, which from their original observations of natural minerals and their practical applications of economic interest (metal resources) and aesthetic appeal (gems) slowly became core parts of the physical and chemical developments of science in the period following the industrial revolution. Clashing with their fundamental importance in scientific education, mineralogy and crystallography are now encountering an identity crisis in academic curricula, and the net effect is an overall and diffuse rapid shrinking of competences concerning natural materials and their transformation products. All basic and applied sciences are suffering enormously from this general attitude of academic myopia. Some of these issues are discussed in the first chapter of this volume, where the editors argue that mineralogy is a truly interdisciplinary fundamental science as it lies in a very special position between the Earth sciences and materials science. The competent mineralogist should possess a profound perception of the complexity of natural materials, he/she should have the necessary knowledge of the ancient and recent geological and physicochemical processes acting on them and on the artifacts produced by human activities, and he/she should master most of the methods and techniques useful for investigating our common heritage.

The chapters contributed to the volume recognize the important and diverse contributions of mineralogy to the valorization, characterization, interpretation and conservation of cultural heritage. The book focuses on examples of materials and methodological issues rather than technical/analytical details. We have attempted to deal with the cultural heritage materials in chronological order of their technological developments, to relate them to past human activities, and to highlight unresolved problems in need of investigation.

The chapters collected in the present volume, of necessity, show only a selection of examples of the mineralogical applications to cultural heritage. Natural minerals and rocks [silica (chapter 2), obsidian (chapter 11), lithics (chapter 10), gemstones (chapters 8 and 9), pigments (chapter 7)] used by man in antiquity for various purposes are described. Insights into transformation products provide fundamental information on pre-historic and historic man-made materials [glass (chapter 3), mortars (chapter 4), metals (chapter 5), ceramics (chapter 6)]. An exception to this materials-ground approach is chapter 12, which illustrates some state-of-the-art methodological developments based on synchrotron radiation.

The editors originally planned to cover other key topics of mineralogical research related to human heritage, *e.g.* the important advances in our knowledge of apatite and apatite-composites, related to bio-materials such as bones and teeth. Lack of time precluded several authors from contributing. The reader will hopefully forgive the volume limitations and value the large amount of information collected by the authors. The authors are thanked for their efforts and competence; as editors we are greatly indebted for their knowledge and patience.

Gilberto Artioli and Roberta Oberti
Padova and Pavia, July 2019