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A Practical Guide to Ore Microscopy—Volume 1

Mineral Identification

This book offers a guide to the microscopic study of metallic ores with reflected light. It combines a rigorous approach with an attractive and easy-to-follow format, using high-quality calibrated photomicrographs to illustrate the use of color for ore identification. The ore identification methodology is updated with systematic color analysis and the application of new multispectral reflectance datasets, which offer an efficient tool for automated ore characterization. In addition, the first volume of this twopart work discusses the essential gangue minerals.

Readers will gain familiarity with the method as they follow its application to over 200 selected minerals, comprising the most important ore (≈ 150) and gangue (≈ 50) minerals, which are described in the text. Each entry includes an explanatory text with corresponding color photomicrographs for each of the most common microscope settings, preceded by a table summarizing the ore's main properties, and followed by spectral information in the visible and near-infrared ranges (specular reflectance values from 370 to 1000 nm). Some uncommon, strategic ores, e.g. columbotantalite ("coltan") and monazite, receive particular attention or are described for the first time with reflected light.

Lastly, the book presents a learning strategy for beginners and students. The approach is essentially practical, focusing on the development of observation skills, including self-checking through proposed practical tasks. In addition, the traditional use of determinative tables is critically reviewed and updated.

This book is part of a two-volume work. The second volume focuses on intergrowths/textural analysis and interpretation, as well as computer vision-based automation and applications to ore processing/geometallurgy.

The intended audience includes professionals and engineers dealing with mineral resources, as well as postgraduate students. The book also provides lifelong learning support for free-lancers and a valuable reference resource for practical university teaching.

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