

# Geomaterials under the Microscope

## - A Colour Guide

**Building stone, roofing slate, aggregate, concrete, mortar, plaster, bricks, ceramics and bituminous mixtures**

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### Description:

Geomaterials are of enormous economic importance to the global construction industry. This is the first comprehensive guide to the petrography of geomaterials, making the petrographers specialist knowledge available to practitioners, educators and students worldwide interested in modern and historic construction materials, be they microscopists or in the fields of geology, architecture, surveying, engineering, construction, archaeology, conservation, materials science and forensic science.

The book provides some 365 superb quality colour photomicrographs of geomaterials plus concise explanations of their petrographic properties and how to interpret them.

An introductory chapter provides an overview of geomaterials practice and a state-of-the-art review of petrographic techniques. Each of the subsequent chapters covers a different group of construction materials and includes an explanation of their history, manufacture and use in construction. The text draws upon diverse published references to provide a unique summary of the properties and classification of construction materials. Comprehensive lists of further reading are provided for each materials type.

### Readership:

Practitioners, educators and students in Petrography, Microscopy, Geology, Surveying, Engineering, Archaeology, Conservation, Architecture, Materials science and Forensic science.

### Key Features:

- First comprehensive guide to the petrography of geomaterials.
- Worldwide value to all interested in modern and historic construction materials.
- Top quality colour photomicrographs.
- Concise explanatory text.

**Contents:** **1: Introduction**, Overview of geomaterials and petrography, Petrographic techniques, Sampling and specimen preparation. **2: Building stone**, Introduction to building stone, Testing building stone, Stone from igneous, sedimentary & metamorphic rocks, Petrography of stone defects and decay. **3: Roofing slate**, Introduction to roofing slate, Testing roofing slates, Properties of roofing slate, Weathering and deterioration of roofing slate, Interpretation of slate test results. **4: Aggregates**, Introduction to aggregates, Aggregate type, Aggregate grading, shape and surface texture, Soundness, impurities and undesirable constituents of aggregates, Potential alkali-reactivity of aggregate for concrete, Matching aggregates for conservation. **5: Concrete**, Introduction to concrete, Assessment of concrete structures, Investigating the composition and quality of concrete, Concrete aggregates, Portland-type cements, Additions and admixtures, Water/cement ratio, Air voids, Modal analysis of concrete, Workmanship, Examining deteriorated and damaged concrete, Carbonation and reinforcement corrosion, Cracking, Weathering, Sulfate attack, TSA, DEF, Sea water attack, Attack by acids and alkalis, Pop-outs, Alkali-aggregate reactions, Fire-damaged concrete, High-alumina cement concrete. **6: Concrete products**, Architectural cast stone, Aircrete, Calcium silicate, Asbestos-cement. **7: Flooring materials**, Screed, Terrazzo, Synthetic resin. **8: Mortar, plaster and render**, Gypsum plaster, FGD gypsum plaster, plasterboard, Plaster defects, Lime mortar ingredients & defects, Portland cement mortar ingredients & defects, Specialist mortars. **9: Bricks, terracotta & other ceramics**, Introduction to ceramics, Clay brick, Terracotta, Ceramic tile, Architectural glass, **10: Bituminous mixtures**, Introduction to bituminous mixtures, Microscopy of bituminous mixtures. **Appendix A:** Staining techniques for geomaterials petrography, Etching and staining techniques for cement minerals and slags. **Appendix B:** Suppliers of petrographic equipment, training and literature. Index