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Nota di contenuto	Frontmatter -- Preface -- Table of Contents -- 1. Significant Ages - An Introduction to Petrochronology / Engi, Martin / Lanari, Pierre / Kohn, Matthew J. -- 2. Phase Relations, Reaction Sequences and Petrochronology / Yakymchuk, Chris / Clark, Chris / White, Richard W. -- 3. Local Bulk Composition Effects on Metamorphic Mineral Assemblages / Lanari, Pierre / Engi, Martin -- 4. Diffusion: Obstacles and Opportunities in Petrochronology / Kohn, Matthew J. / Penniston-Dorland, Sarah C. -- 5. Electron Microprobe Petrochronology / Williams, Michael L. / Jercinovic, Michael J. / Mahan, Kevin H. / Dumond, Gregory -- 6. Petrochronology by Laser-Ablation Inductively Coupled Plasma Mass Spectrometry / Kylander-Clark, Andrew R. C. -- 7. Secondary Ionization Mass Spectrometry Analysis in Petrochronology / Schmitt, Axel K. / Vazquez, Jorge A. -- 8. Petrochronology and TIMS / Schoene, Blair / Baxter, Ethan F. -- 9. Zircon: The Metamorphic Mineral / Rubatto, Daniela -- 10. Petrochronology of Zircon and Baddeleyite in Igneous Rocks: Reconstructing Magmatic Processes at High Temporal Resolution / Schaltegger, Urs / Davies, Joshua H.F.L. -- 11. Hadean Zircon Petrochronology / Harrison, T. Mark / Bell, Elizabeth A. / Boehnke, Patrick -- 12. Petrochronology Based on REE-Minerals:

Monazite, Allanite, Xenotime, Apatite / Engi, Martin -- 13. Titanite Petrochronology / Kohn, Matthew J. -- 14. Petrology and Geochronology of Rutile / Zack, Thomas / Kooijman, Ellen -- 15. Garnet: A Rock-Forming Mineral Petrochronometer / Baxter, E. F. / Caddick, M. J. / Dragovic, B. -- 16. Chronometry and Speedometry of Magmatic Processes using Chemical Diffusion in Olivine, Plagioclase and Pyroxenes / Dohmen, Ralf / Faak, Kathrin / Blundy, Jon D. -- RiMG Series

Sommario/riassunto

Petrochronology is a rapidly emerging branch of Earth science that links time (ages or rates) with specific rock-forming processes and their physical conditions. It is founded in petrology and geochemistry, which define a petrogenetic context or delimit a specific process, to which chronometric data are then linked. This combination informs Earth's petrogenetic processes better than petrology or geochronology alone. This volume and the accompanying short courses address three broad categories of inquiry.Conceptual approaches chaptersinclude petrologic modeling of multi-component chemical and mineralogic systems, and development of methods that include diffusive alteration of mineral chemistry.Methods chaptersaddress four main analytical techniques, specifically EPMA, LA-ICP-MS, SIMS and TIMS.Mineral-specific chaptersexplore applications to a wide range of minerals, including zircon (metamorphic, igneous, and detrital/Hadean), baddeleyite, REE minerals (monazite, allanite, xenotime and apatite), titanite, rutile, garnet, and major igneous minerals (olivine, plagioclase and pyroxenes). These applications mainly focus on metamorphic, igneous, or tectonic processes, but additionally elucidate fundamental transdisciplinary progress in addressing mechanisms of crystal growth, the chemical consequences of mineral growth kinetics, and how chemical transport and deformation affect chemically complex mineral composites. Most chapters further recommend areas of future research.