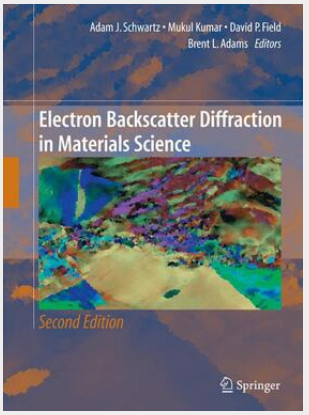
Schwartz / Field / Kumar

Electron Backscatter Diffraction in Materials Science



Electron backscatter diffraction is a very powerful and relatively new materials characterization technique aimed at the determination of crystallographic texture, grain boundary character distributions, lattice strain, phase identification, and much more. The purpose of this book is to provide the fundamental basis for electron backscatter diffraction in materials science, the current state of both hardware and software, and illustrative examples of the applications of electron backscatter diffraction to a wide-range of materials including undeformed and deformed metals and alloys, ceramics, and superconductors. The text has been substantially revised from the first edition, and the authors have kept the format as close as possible to the first edition text. The new developments covered in this book include a more comphrensive coverage of the fundamentals not covered in the first edition or other books in the field, the advances in hardware and software since the first edition was published, and current examples of application of electron backscatter diffraction to solve challenging problems in materials science and condensed-matter physics.

Electron backscatter diffraction (EBSD), when employed as an additional characterization technique to a scanning electron microscope (SEM), enables individual grain orientations, local texture, point-to-point orientation correlations, and phase identification and distributions to be determined routinely on the surfaces of bulk polycrystalline materials. The application has experienced rapid acceptance in metallurgical, materials, and geophysical laboratories within the past decade due to the wide availability of SEMs, the ease of sample preparation from the bulk, the high speed of data acquisition, and the access to complimentary information about the microstructure on a submicron scale. This entirely new second edition describes the complete EBSD technique, from the experimental set-up, representations of textures, and dynamical simulation, to energy-filtered, spherical, and 3-D EBSD, to phase identification, in situ experiments, strain mapping, and grain boundary networks, to the design and modeling of materials microstructures. Numerous application examples including the analysis of deformation microstructure, dynamic deformation and damage, and EBSD studies in the earth sciences provide details of this powerful materials characterization technique.

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