BOOK REVIEW

LUMINESCENCE. Edited by G. Remond, L. Balk, and D.J. Marshall. Scanning Microscopy Supplement 9, Proceedings of the 13th Pfefferkorn Conference, 1995. Softbound, 286 p. $66 U.S.

Luminescence contains 24 papers mostly dealing with cathodoluminescence and mostly as observed with electron beam excitation in a scanning electron microscope or with thermoluminescence. Unlike many conference proceedings, these are full papers, nicely formatted, with high quality illustrations, and with complete (full titles) bibliographies. As such, the volume is a useful reference work.

The subject matter is an eclectic mix. Ten papers deal with mineral luminescence, eight papers with semiconductors, and six papers with experimental technique. Of concern here are the papers on mineralogical topics. The titles give the flavor of this set of papers: "Thermoluminescence of zircon" (Iacconi); "Cathodoluminescence of rare earth doped zircons. I. Their possible use as reference materials" (Cesbron, Blanc, Ohnenstetter, Remond), "II. Relationship between the distribution of the doping elements and the contrasts of images" (Remond, Blanc, Cesbron, Ohnenstetter, Rouer); "Advances in research of defects in quartz based on luminescence" (Halperin); "Diamond luminescence" (Heiderhoff, Balk); "Cathodoluminescence of carbonates: New applications in geology and archaeology" (Barbin); "Plagioclase studies by ionoluminescence (IL) and particle-induced x-ray emission (PIXE) employing a nuclear microprobe" (Homman, Yang, Malmqvist, Hanghoj); "Interpretation of cathodoluminescence spectra obtained from dolomite and calcite gangue minerals, and dolostone breccias in the central Tennessee zinc district (USA)" (Kopp, Fuller, Owen); "Cathodoluminescence of some synthetic calcite crystals. Investigation of the role played by cerium" (Chapoulie, Bectel, Borschneck, Schvoerer, Remond); "Three-dimensional thermoluminescence spectra and their application in the study of some sedimentary quartz" (Prescott, Scholefield, Franklin)

Luminescence petrography has been used for many years to bring out growth banding and other internal textures within mineral grains. Actually measuring the spectra, preferably on a pixel by pixel basis, provides much more information. For example, zircons often contain trace quantities of lanthanides. These produce sharp bands due to $f \rightarrow f$ transitions, as nicely documented in the paper by Cesbron et al. Three other papers describe cathodoluminescence, thermoluminescence of zircon, and the use of synthetic zircon as an emission standard.

Other minerals that produce strong cathodoluminescence include diamond, calcite, dolomite, quartz, and plagioclase. The thrust of all of the papers is the application of luminescence imaging techniques as a characterization tool. Most of the papers set out to interpret the images in terms of spectra, responsible ions, and defects. The book is not, as might be deduced from the title, a comprehensive treatise on mineral luminescence. There is relatively little on the petrologic interpretations of grain growth and mineral genesis drawn from luminescence images. There are many luminescence minerals that are not mentioned at all. However, within the framework of the book's objectives, the papers will be of great value to those given the task of interpreting images seen in a luminescence microscope.

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