

PRELIMINARY STUDIES ON THE SPECTRA LUMINESCENCE OF BRENKITE $\text{Ca}_2\text{F}_2\text{CO}_3$. E. Crespo-Feo¹, J. Garcia-Guinea², V. Correcher³, and A. Nieto-Codina², ¹Dpt. Cristalografía y Mineralogía. Fac. CC. Geológicas-UCM. C/ Jose Antonio Novais 2. Madrid 28040 Spain, correspondence autor: ecrespo@geo.ucm.es. ²Museo Nacional de Ciencias Naturales-CSIC. C/ Jose Gutierrez Abascal, 2 Madrid 28006 Spain, ³CIEMAT. Av. Complutense 22. Madrid 28040 Spain.

Introduction: Brenkite ($\text{Ca}_2\text{F}_2\text{CO}_3$) is an orthorhombic mineral with *Pbcn* space group that is reflected in its external habit, radiated aggregate fibers (Fig.1a) with well developed crystal faces at the top of the laths (Fig.1b).

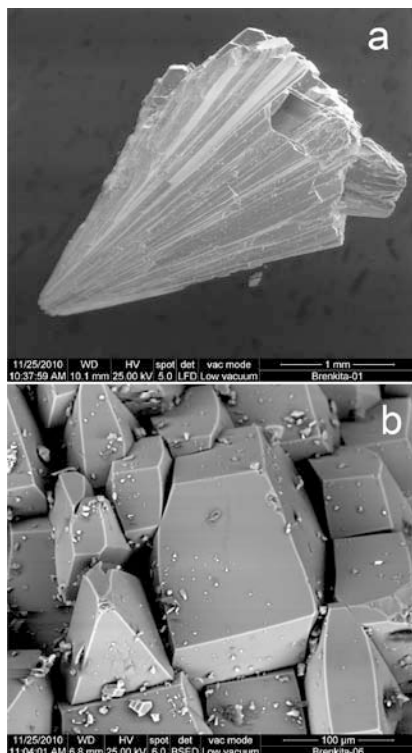


Fig.1. Scanning Electron Microscope (ESEM) images of the studied brenkite: (a) radial intergrowth of prismatic crystals; (b) detail of the crystal faces from the top of the fibers.

It was first described in 1978 [1] and, since brenkite is not a common mineral, very few papers have dealt on this carbonate [1-3]. No previous works on its luminescence has been developed therefore this is the first approached to its luminescence features.

Methods: Brenkite was characterized by means of X-ray powder diffraction (XRD) using a Phillips PW1710/00 diffractometer with a $\text{CuK}\alpha$ radiation source, equipped with a graphite monochromator. Chemical analyses, together with the scanning electron microscope images, were obtained by environmental scanning electron microscopy and energy dispersive X-ray spectrometer (ESEM-EDS) using an Inspect-S of

the FEI Company. CL spectra were performed in low vacuum mode without coating, using a Gatan MonoCL3 detector and PA-3 photomultiplier attached to the ESEM. The PMT covers a spectral range of 185 nm–850 nm. The excitation for CL measurements was provided at 25 kV electron beam.

Results and Discussion: By XRD the mineral seems to be pure brenkite and the chemical analyses (Ca 44%, F 23% and C 6%) fit very closely with the theoretical composition of the mineral [1,4], although some Yb has been observed (1%). CL spectra were performed in four different point along the brenkite fiber. If we consider the aggregate as a part of a spherical morphology, the analyses were located as follows: close to the inner part of the radial aggregate, in the middle of the fiber length, at the upper part of the fiber, and on the well developed crystal faces at the top. Spectra show similar features except the intensity variability. The main luminescence response is located in the blue part of the spectrum with most intense peak situated at ~ 380 nm. Slighter signals are recorded at ~ 660 and ~ 760 nm. These could be related to some impurities as well as the blue region could be intrinsic although more detailed analysis are required. Also, it is needed to understand the Yb implication on the brenkite luminescence.

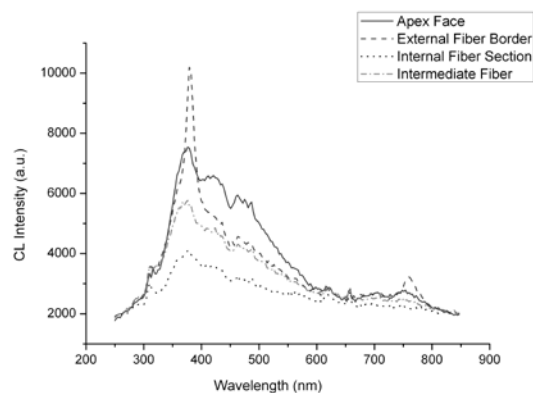


Fig.2. CL spectra of 4 different points along the brenkite fiber. See text for a detailed description.

References: [1] Hentschel G. et al. (1978) *Neues Jahrb.Min.,Mh.*, 325-329. [2] Leufer U. and Tillmanns E. (1980) *Tschermaks Mineral. Petrog. Mitt.*, 27, 261–266. [3] Grice J. D. et al. (2007) *Chem. Rev.*, 107, 114–132. [4] Anthony J. W. et al. (2003) *Handbook of mineralogy (Volume V-Borates, Carbonates, Sulfates): Mineral Data Publishing, Tucson, Arizona, 813 p.*