

# Mineralogy, an introduction to the theoretical and practical study of minerals 1912 [Hardcover]

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## Fe-dolomite (teruelite) from the Keuper of the southern sector of the Iberian Mountain Range, Spain

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### RESUMEN

En la parte meridional del Keuper de la Cordillera Ibérica una variedad de dolomita ferrosa es el mineral característico mineralógico. Los análisis químicos y el estudio cristalográfico por medio de la técnica de difracción de rayos X de monocristales confirman que se trata de una variedad de la dolomita y no de la ankerita. Solo ligeras diferencias morfológicas han sido apreciadas entre dolomita y teruelita. Así, la teruelita cristaliza en la forma (4041) mientras que la dolomita cristaliza preferentemente en la forma (1011).

### INTRODUCTION

A ferroan variety of dolomite occurs in the Keuper of the southern sector of the Iberian Mountain Range. This variety of dolomite (teruelite) is a typical mineralogical curiosity of the Iberian Peninsula, the most important localities of which are Monte Calvario and Barranca del Salobre (Teruel, Spain) (Maestre, 1845; Quiroga, 1873; Chaves, 1891; Calderon, 1910; Martín-Cardoso and Garrido, 1931; Muñoz and Pinedo, 1951; Fernández-Galiano, 1954; Sinkankas, 1964; Marfil, 1970).

Chemical and crystallographic studies of teruelite and its comparison with the known crystal structures of dolomite and Fe-ankerite (Althoff, 1977; Beran and Zemann, 1977) confirm the hypothesis of Martín-Cardoso and Garrido (1931) that there is no crystallographic reason which would suggest that teruelite is a different species or variety of dolomite. From the morphological point of view, however, slight differences in the habit of teruelite and dolomite can be appreciated. This justifies this study.

### EXPERIMENTAL AND RESULTS

1. Crystal habit. — Teruelite appears as small black rhombohedral crystals that vary in their average dimension between 1 mm and 2 cm; their average size is 5 mm. The habit of teruelite (Martín-Cardoso and Garrido, 1931; Fernández-Galiano, 1954; Sinkankas, 1964) is mainly (4041) whereas the dolomite habit is (1011). Other combinations are (4041) and (0001), and (4041), (1011) and (0001) (Fig. 1).

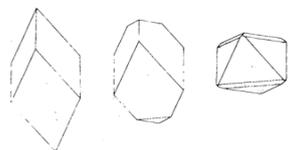


Fig. 1. Teruelite crystals:  $e$  (4041) rhombohedron,  $r$  (1011) rhombohedron and  $c$  (0001) pinacoid.

2. Chemical analysis. — In Table 1 the chemical analysis of some teruelites are given.

3. Optical properties. — The refraction indices have been determined using a monochromatic sodium light ( $\lambda = 5893 \text{ \AA}$ ). The obtained results are  $n_x = 1.658$  and  $n_z = 1.509$ . They coincide with the ones available in the bibliography (Dana's System of Mineralogy, 1966) about ferroan dolomite.

4. X-ray investigation. — Single crystals of the type specimen were examined and suitable fragment was ground to an sphere 0.5 mm in diameter. According to Althoff (1977) the hexagonal unit-cell parameters are  $a = 4.8033(9)$  and  $c = 15.984(4) \text{ \AA}$ , and the space group is  $R\bar{3}$ . These parameters were confirmed by our measurements on single crystal diffractometer with graphite-monochromatized  $\text{MoK}\alpha$  ( $\lambda = 0.71069 \text{ \AA}$ ) radiation:  $a = 4.81(1)$  and  $c = 16.00(9) \text{ \AA}$ .

321 reflections were measured and considered as observed ( $I \geq 2.5\sigma(I)$ ). These were used in the subsequent analysis. The intensities were corrected for Lorentz and polarization factors. No corrections were made for absorption. The refinement was carried out by the programme SHELX76 (Sheldrick, 1976) with anisotropic thermal parameters to a

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