



JOURNAL OF
APPLIED
CRYSTALLOGRAPHY

Volume 56 (2023)

Supporting information for article:

\bar 101 contact twins in gypsum experimentally obtained from calcium carbonate enriched solutions: mineralogical implications for natural gypsum deposits

Andrea Cotellucci, Fermín Otálora, Àngels Canals, Joaquin Criado-Reyes, Luca Pellegrino, Marco Bruno, Dino Aquilano, Juan Manuel Garcia-Ruiz, Francesco Dela Pierre and Linda Pastero

S1. Optical microscopy image

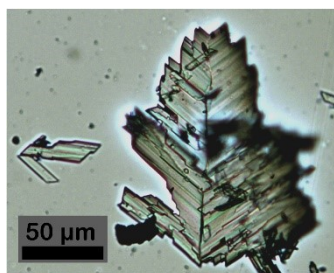


Figure S1 Optical microscopy image of $\bar{1}01$ contact twin observed in G2 solution. By means of optical microscopy under crossed polarizers we measured 26° as extinction angle among the individuals forming the twin, and thus, we identified the $\bar{1}01$ twin law.

S2. The extinction angles for the five twin laws

To calculate the extinction angles of the five gypsum twin laws, it is required to:

- i) Project the optical indicatrix of gypsum on the (010) plane (Fig. S2).
- ii) Apply the twin law to generate the “twinned optical indicatrix” (T) (Fig. S3).
- iii) Measure the angle value generated between the “old” refractive indices (e.g., γ) and the new one (γ_T or α_T) (Fig. S3). The value of this angle represents the extinction angle for the twin law, i.e., how much to rotate the crystal to move the twinned sub-crystal into extinction position when the parent sub-crystal is already extinguished.

Gypsum

Crystal system : monoclinic

Point group: 2/m

Space group: C2/c (De Jong and Bouman, 1939)

Cell parameters:

$$\begin{aligned} a_0 &= 5.63 \\ b_0 &= 15.15 \\ c_0 &= 6.23 \\ \beta &= 113.5^\circ \end{aligned}$$

$$\begin{aligned} [001]\hat{O}\alpha &= 38^\circ \\ [001]\hat{O}\gamma &= 52^\circ \end{aligned}$$

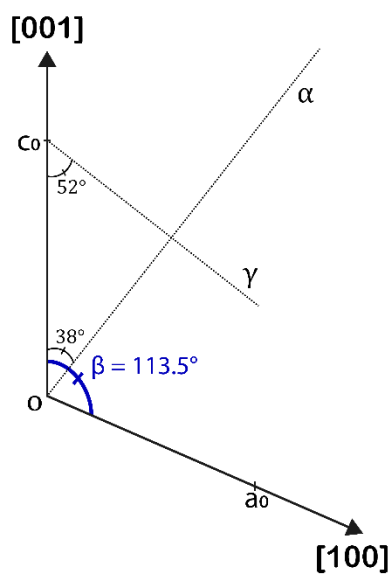


Figure S2 Gypsum reference frame used to measure the extinction angles of the five gypsum twin laws (De Jong and Bouman, 1939). α and γ represent the refractive indices of gypsum ($\alpha=1.519 - 1.521$; $\gamma=1.529 - 1.531$) (Chang et al., 1996). The monoclinic C2/c space group of gypsum ($a_0 = 5.63$, $b_0 = 15.15$, $c_0 = 6.23$ Å; $\alpha = \gamma = 90^\circ$; $\beta = 113.50^\circ$) (De Jong and Bouman, 1939) was used to project the optical indicatrix of gypsum on the (010) plane.

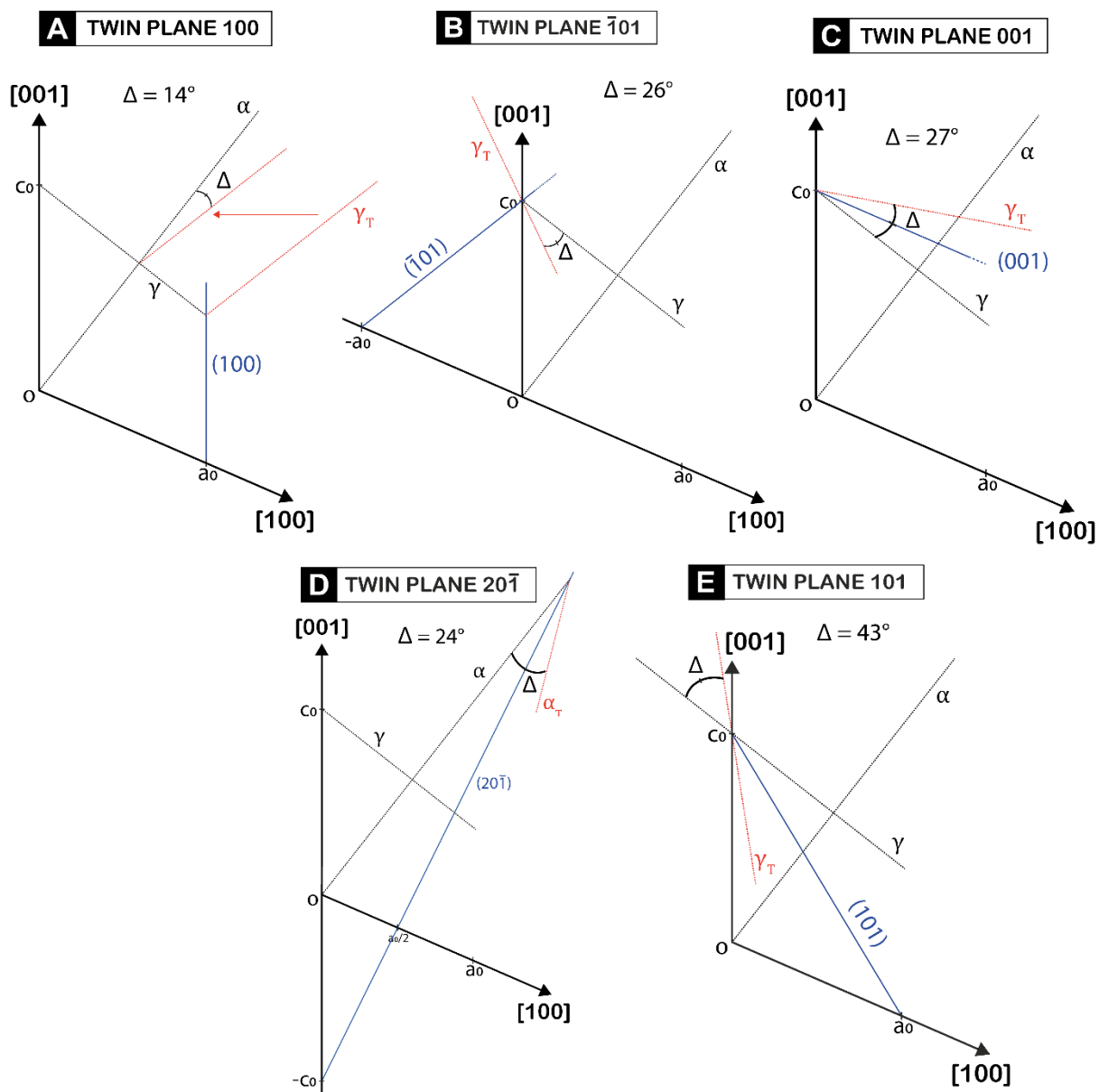


Figure S3 Extinction angles of the five gypsum twin laws.