MS13-P03

Structural investigation of the phase transition in the 18-carat gold alloy starting from the disordered state

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Phase transition sequences in gold alloys haveattract a lot of interest at the first half of the 20Th century. Where, till now the thorough sequences ant the temperatures are not investigated. The knowing of such precise temperatures and sequences is of high importance according to the gold alloys industrial use [1-3]. Herein,In-situ temperature XRD and mechanical spectroscopy were applied to study phase transitions in AuCu alloy. The phase transition sequences, with the disorder as starting state for the thermal cycle, was investigated upon heating and cooling using heating rate of 1K/min. The sequences of phase transitions recorded show an important succession at continuous heating and subsequent cooling. The transition temperatures were thoroughly determined. This transition sequences determine temperature dependency of elastic and anelastic properties. The mechanical spectroscopy using forced torsion pendulum shows twin boundaries peak as typical peak of the orthorhombic phase AuCuII and transient peak with the onset of the tetragonal AuCuI in A1 phase with the classical Zener peak.

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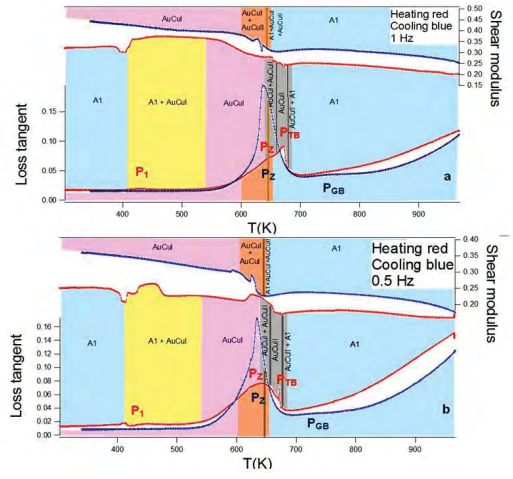

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MS13-P04

New insights into Eugsterite's structure from SC-ED and PXRD data

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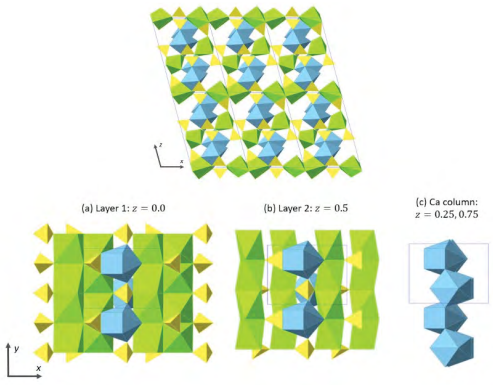
Eugsterite is a mineral commonly associated with halite, thenardite, bloedite, gypsum, glauberite and nesquehonite and occurs in some parts of Kenya and in the Konya Basin in Turkey Its crystal structure is unknown and the only information is a list of d spacings and intensities obtained from an X-ray powder pattern of an impure synthetic sample (Vergouwen, 1981).

In this work, we have confirmed the difficulty on purifying eugsterite, reason because the structure solution had to be attempted from Single Crystal Electron Diffraction (SCED) data of a multiphasic sample where only single crystals of eugsterite were measured with the continuous rotation method (Wang *et al.*, 2017).

The structural model obtained from the SCED data was lately used to refine this structure through a Powder X-ray Diffraction (PXRD) dataset of an impure sample containing gypsum, halite and thenardite in addition to eugsterite.

The structure of Eugsterite consists of two crystallographically independent $CaNa(SO_4)$ layers along the *xy*-plane. One layer can be described by two linked columns of NaO_6 polyhedra interconnected via cornersharing SO_4 tetrahedra. The other layer is described as columns formed by face-sharing NaO_6 polyhedra in trigonal antiprismatic arrangement interconnected via cornersharing SO_4 tetrahedron. The layers are interlinked via columns of edge-sharing CaO_8 polyhedra.



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Wang, Y., Takki, S., Cheung, O., Xu, H., Wan, W., Öhrström, L. & Ken Inge, A. (2017). Chem. Commun. 53, 7018–7021.

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