MS14-P15 | CRYSTAL STRUCTURE AND THERMODYNAMIC BEHAVIOR OF $Bi_6Te_2O_{15}$: THE LIKELY STRUCTURE OF THE RARE MINERAL PINGGUITE

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Pingguite is a rare mineral reported for the first time in 1994 [1]. However, its crystal structure was not reported, only cell parameters and the existence of a phase transition around 800°C [1, 2].

With this contribution, we aim to shade some new light onto this rare mineral by investigating in details the structural properties at room temperature and as function of temperature coupled to detailed TGA/DSC experiment.

We synthetized $Bi_6Te_2O_{15}$ using a solid state reaction according to the literature [3]. We were able to solve its crystal structure using powder diffraction. The system crystallizes in the space group Pnma with a = 10.61156(7) Å, b = 22.7446(2) Å and c = 5.39906(4) Å in good agreement with the initial report on pingguite [1]. In addition, we confirm the existence of a phase transition from $Bi_6Te_2O_{15}$ to the cubic phase $Bi_6Te_2O_{13}$ around 840°C.

We investigated the crystal structure of synthetic pingguite as function of temperature and were able to solve its crystal structure and demonstrate the existence of the reduction of Te^{+VI} to Te^{+IV} around 840°C giving rise to the cubic phase $Bi_6Te_2O_{13}$ at high temperature.

[1] Sun Zhifu, et al. (1994) Pingguite; a new bismuth tellurite mineral. Acta Mineralogica Sinica, 14(4), 315–321
[2] John L. Jambor, et al., American Mineralogist, Volume 81, pages 766-770, 1996
[3] Hiroshi Sakai, et al., Hyperfine Interactions 90 (1994), pp 401-405