

Poster Presentation

MS74.P16

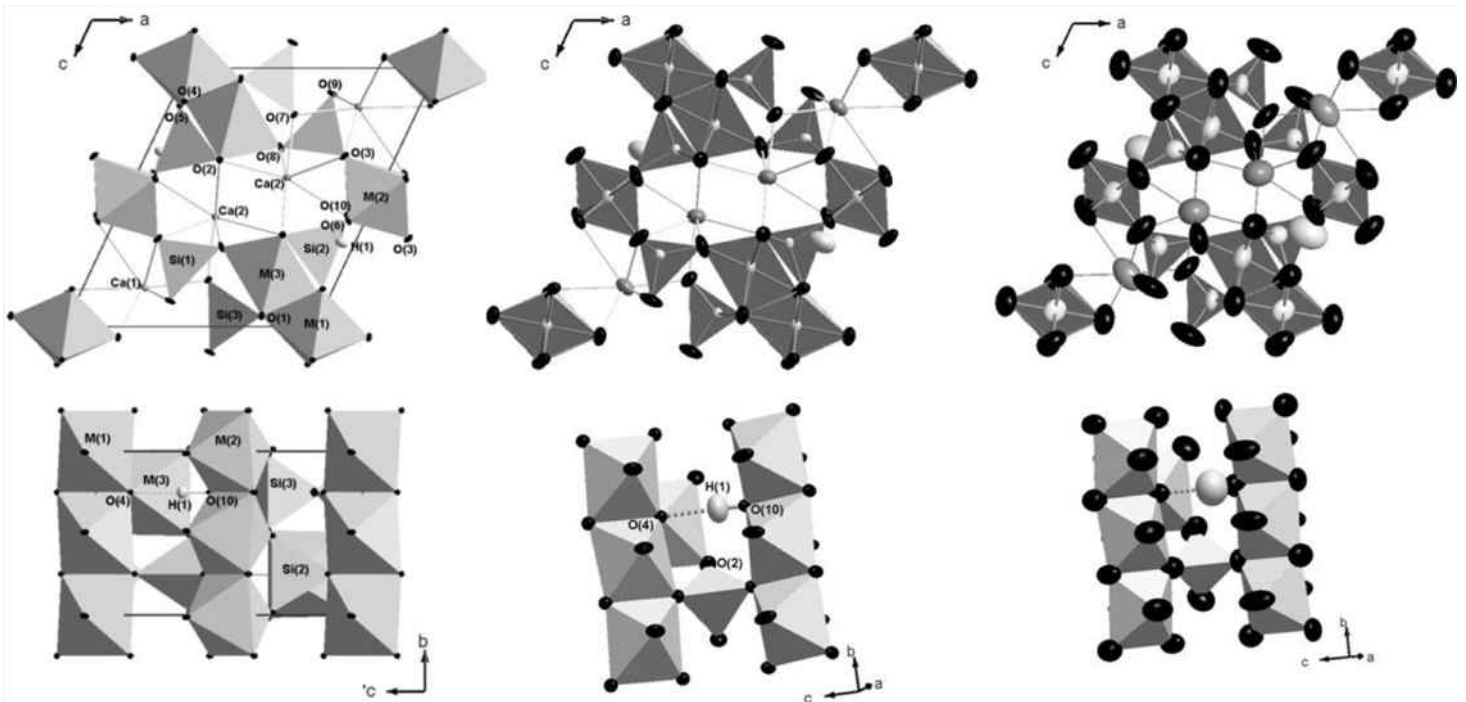
Detailed single crystal studies on silicates using neutron diffraction

M. Meven¹, G. Gatta²

¹RWTH Aachen, Institut für Kristallographie and Forschungszentrum Jülich GmbH, Jülich Centre for Neutron Science, Outstation at MLZ, Garching, Germany, ²Università degli Studi di Milano, Dipartimento di Scienze della Terra, Milano, Italy

Up to now minerals of the silicate family are an interesting and versatile topic of research. Different members of the epidote, lithium tourmaline and beryl groups with very different structural features were studied on the single crystal diffractometer HEIDI at the hot source of the Heinz Maier-Leibnitz Zentrum in Garching (MLZ) in the recent past. The combination of neutron and X-ray diffraction in combination with other methods revealed for each of the studied minerals valuable information about their structural details. Epidote, an important mineral for metamorphic or magmatic petrology was studied with neutrons at room temperature and at 1070 K. The results confirm the high structural stability with no dehydration and only slight thermal expansion [1]. A combined study with x-ray and neutron diffraction on the complex boro-cyclo-silicate elbaite give insight to the displacement regime and H and O order and disorder respectively [2]. Combined single crystal diffraction with x-rays at room temperature and with neutrons at 2.3 K on pezzottaite, an obverse/reverse twin of the beryl family reveals a complex displacement regime with possible partial H₂O replacement [3].

[1] G.D. Gatta, M. Meven, G. Bromiley, *Physics and Chemistry of Minerals*, 2010, 37: 475-45, [2] G. D. Gatta, R. M. Danisi, I. Adamo, M. Meven und V. Diella; *Physics and Chemistry of Minerals*, 2012, 39(7):577-588, [3] G. D. Gatta, I. Adamo, M. Meven und E. Lambruschi; *Physics and Chemistry of Minerals*, 2012, 39(10):829-840



Epidote structure at T=298K (left and middle) and T=1073K (right) [1].

Keywords: hydrogen bonds, site disorder, high temperature neutron diffraction