MS17-04 | Pressure Induced Phase Transition in $CoSO_4 \cdot H_2O$

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Kieserite-type $CoSO_4 \cdot H_2O$ is one of the endmember compositions of the monohydrate sulphate series, most recently discussed as an astrophysically important mineral group apart from rare terrestrial occurrences such as of cobaltkieserite. As sulphates significantly influence melting equilibria on the icy moons of Saturn and Jupiter and possibly lead to subsurface oceans and cryovolcanism [1,2], their investigation in our solar system receives growing attention [e.g. 3]. Hence, knowledge of respective and related mineral phases and their high-pressure behavior seems to be crucial. Even though the high-pressure behavior of sulphate minerals in higher hydration stages has already been subjected to numerous studies, the compression information for the low-hydrated phases is still limited.

Synthetic single crystals were studied by means of in-situ high-pressure XRD and Raman spectroscopy using an ETH-type diamond-anvil cell. During the pressure increase most notably a Raman band around 50 cm^{-1} (ambient pressure) and a second one around 280 cm^{-1} revealed a structural phase transition around 2 GPa. The subsequent XRD investigations revealed that $CoSO_4 \cdot H_2O$ undergoes a compression-induced change of symmetry from monoclinic to a triclinic high-pressure polymorph. The space group seems to change directly from *C*2/*c* into *P*-1.

[1] Kargel J. S. (1991) *Icarus*, **94**, 368-390.
[2] McCord T. B., Hansen G. B., Hibbits C. A. (2001) *Science*, **292**, 1523-1525.
[3] Wang A., Freeman J. J., Jolliff B. L. (2009) *J. Geophys. Res.*, **114**, E04010.