

In situ spectroscopic study of water intercalation into talc: New features of 10 Å phase formation

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ABSTRACT

The synthesis of 10 Å phase via the reaction of talc plus water at 8 GPa and 500 °C was studied by in situ Raman spectroscopy using a diamond-anvil cell. The initial fast (2 h) incorporation of interlayer H₂O molecules into the talc structure is traced by gradual growth of new OH stretching bands at 3592 and 3621 cm⁻¹ and the shift of several framework bands. Further monitoring at HP-HT conditions over 7 h reveals gradual weakening of the 3592 cm⁻¹ band, which can probably be related to the onset of the formation of “long-run” 10 Å phase through the appearance of silanol groups following the model proposed by Pawley et al. (2010), influencing the interlayer hydrogen bonding.

Keywords: 10 Å phase, talc, water transport, subduction