Supplementary Materials

Table S1. The Raman shifts and OH bands by FTIR (v_i), temperature dependence of v_i $(\partial v_i/\partial T)_P$, isobaric mode Grüneisen parameters, as well as intrinsic anharmonic parameters (a_i) for hydrous forsterite.

ν_i (cm^{-1})	$(\partial v_i/\partial T)_P$ (cm^{-1}K^{-1})	$_iP$	$_iT^b$	a_i (10^{-5} K^{-1})
3612	−0.009 [a]	0.065	−0.014	−0.304
3578	−0.016 [a]	0.114	−0.047	−0.616
3566	−0.017 [a]	0.124	−0.022	−0.554
3551	−0.056 [a]	0.417	−0.012	−1.635
3477	0.017 [a]	−0.129		
968	−0.033 [c]	0.895	0.554	−1.297
919	−0.034 [c]	0.971		
880			0.439	
858	−0.023 [c]	0.704	0.403	−1.146
825	−0.022 [c]	0.700	0.550	−0.570
610	−0.012 [c]	0.516	0.692	0.671
590	−0.016 [c]	0.712	0.454	−0.981
545			0.442	
437	−0.026 [c]	1.562	1.427	−0.511
418	−0.027 [c]	1.695		
336			1.663	
320			1.416	
305	−0.031 [c]	2.668	1.310	−5.173
227	−0.016 [c]	1.850	0.652	−4.566

a: mean temperature pressure dependences of OH band in this study; *b:* measured from Hushur et al. [24]; *c:* measured from Yang et al. [57]