Supplementary Material for

High Pressure Raman and Nd^{3+} Luminescence Spectroscopy of Bastnäsite-(REE)CO_3F

C. E. Vennari and Q. Williams

Table S1. SEM summary of the rare earth element content in bastnäsite. Carbon and oxygen contents inferred to be CO_3 plus O=3+(1-[Fcontent]).

	C	O	F	La	Ce	Pr	Nd
Grain 1	-	-	0.819(38)	0.231(12)	0.482(8)	0.049(10)	0.238(15)
Grain 2	-	-	0.929(4)	0.305(1)	0.526(0)	0.040(1)	0.129(1)
Grain 3	-	-	0.996(130)	0.301(34)	0.516(23)	0.040(23)	0.144(39)
Grain 4	-	-	1.068(123)	0.179(25)	0.453(25)	0.047(24)	0.322(28)
Average	1	3.047	0.953(211)	0.254(44)	0.494(35)	0.044(35)	0.208(50)

Figure S1. Example SEM results from bastnäsite.

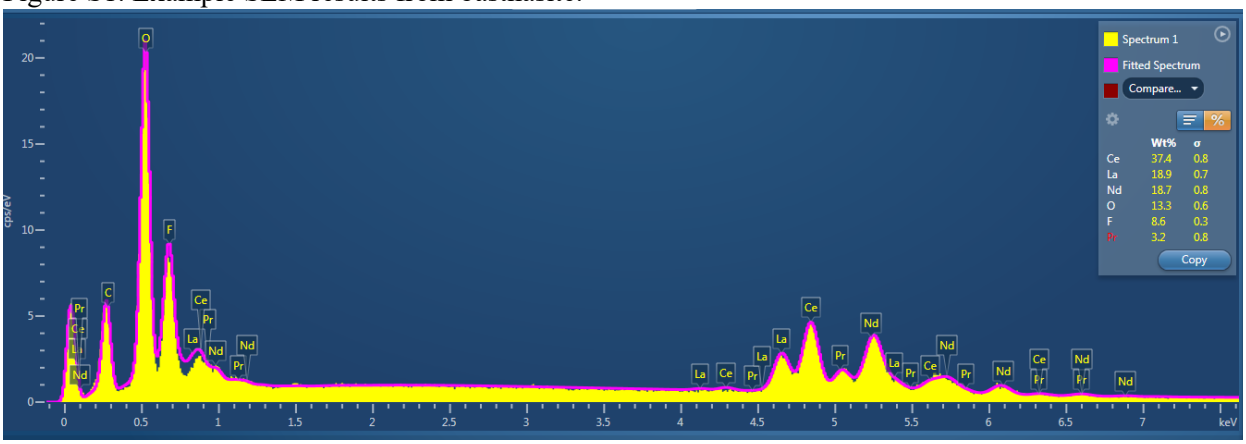

Figure S2. Peak positions of Raman active (a) lattice and (b) carbonate modes in different pressure media; (closed) 4:1 methanol:ethanol, (open) neon.

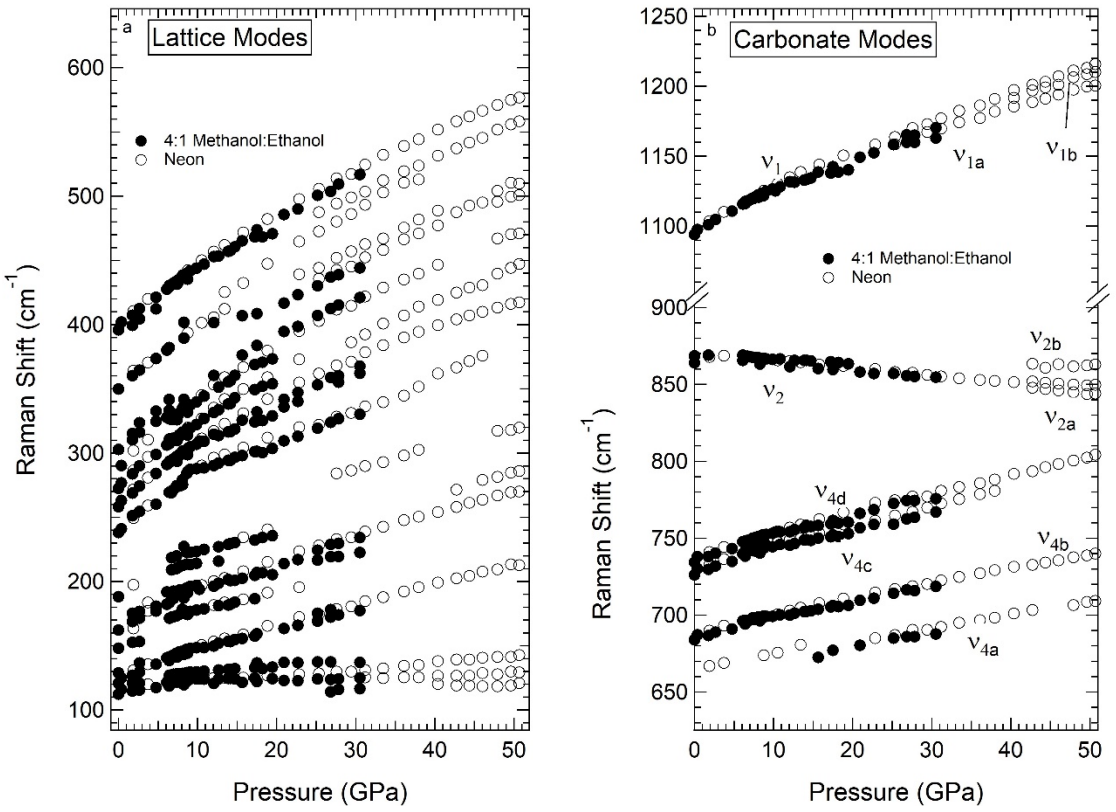

Figure S3. Nd^{3+} luminescence spectra of the $^4F_{3/2}$-->$^4I_{11/2}$ transition with (a) 532 nm and (b) 633 nm.

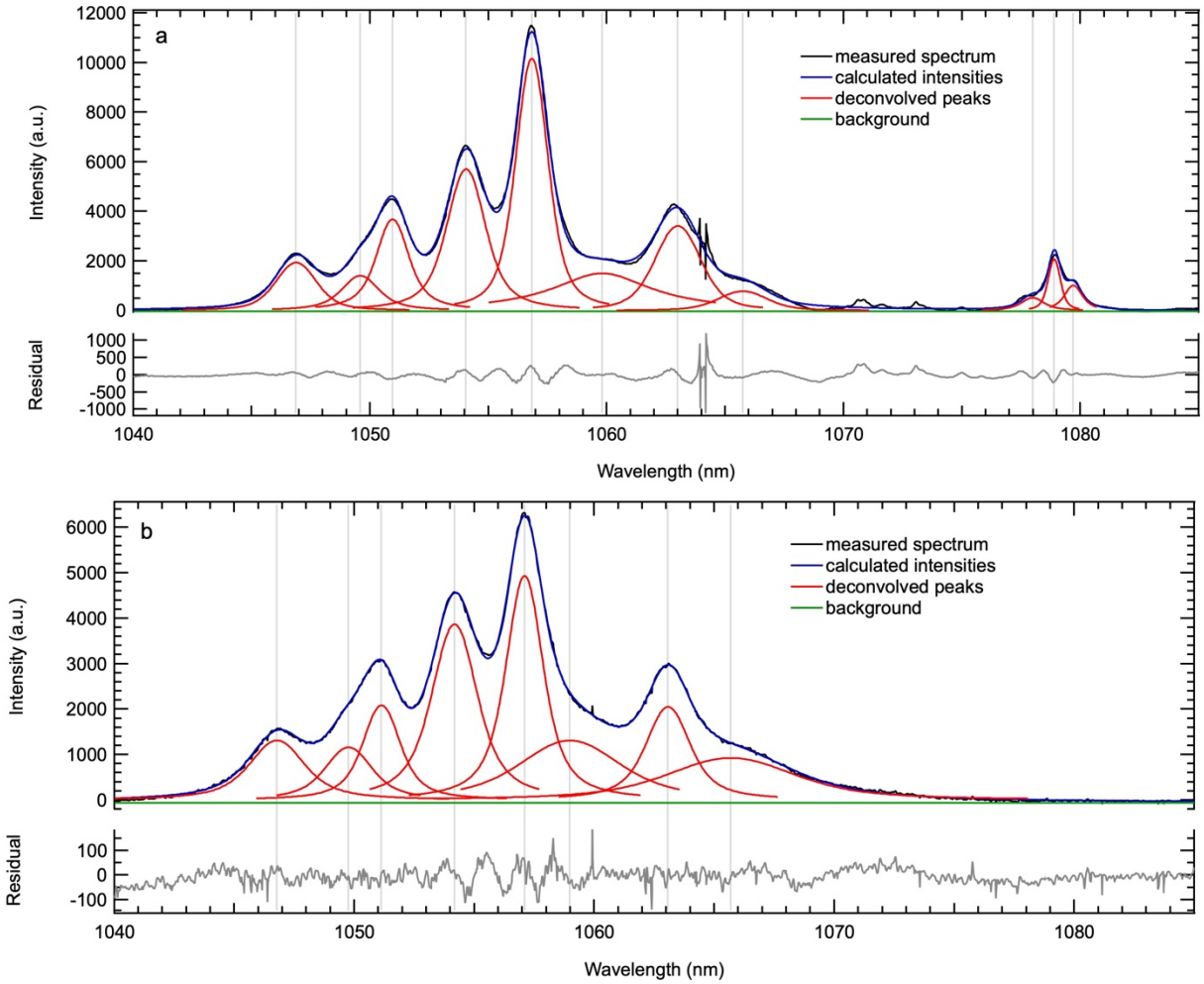

Figure S4. Representative spectra of the symmetric stretch under pressure of bastnäsite-I and -II, peakfit to show the onset of a new low frequency peak in bastnäsite-II.

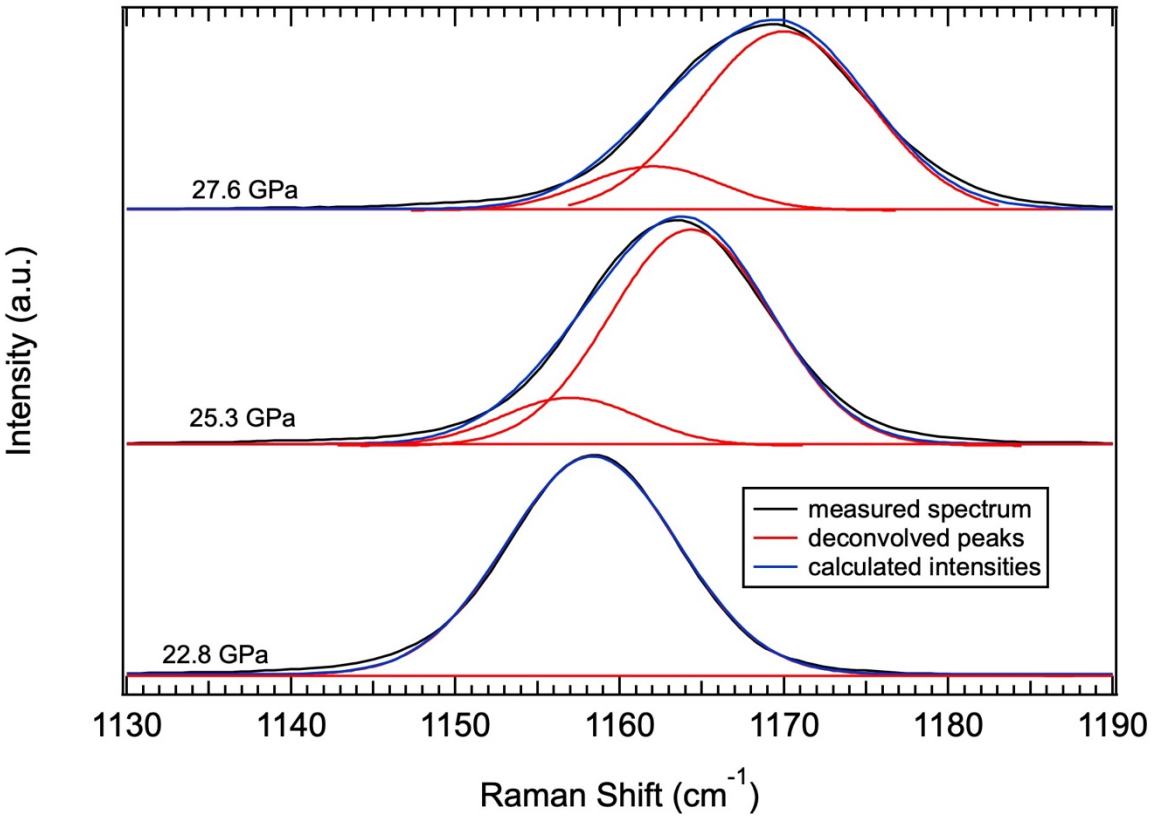

Figure S5. Representative luminescence spectra, at 31.2 GPa, of (a) $^4F_{3/2} \rightarrow {}^4I_{9/2}$, (b) $^4F_{3/2} \rightarrow {}^4I_{11/2}$, and (c) $^4F_{5/2} + {}^2H_{9/2} \rightarrow {}^4I_{9/2}$ transitions. Spectra are deconvolved with Gaussian and Lorentzian peaks; black is the measured spectrum, red is the deconvolved peaks, blue is the calculated intensities, green is the background, and grey is the residual between the fit and the observed intensities

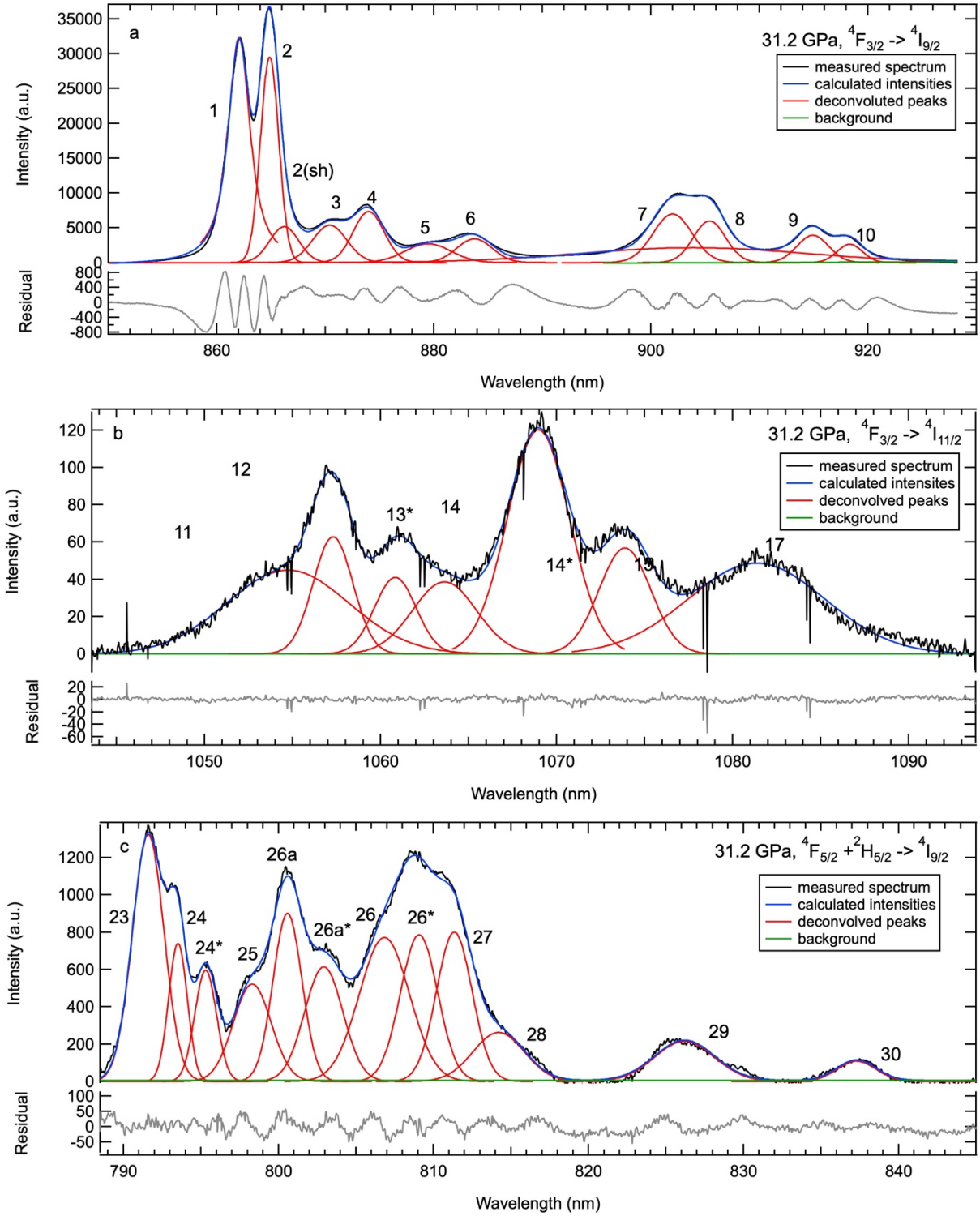

Figure S6. Representative luminescence spectra, at 50.6 GPa, of (a) $^4F_{3/2} \rightarrow {}^4I_{9/2}$, (b) $^4F_{3/2} \rightarrow {}^4I_{11/2}$, and (c) $^4F_{5/2}+{}^2H_{9/2} \rightarrow {}^4I_{9/2}$ transitions. Spectra are deconvolved with Gaussian and Lorentzian peaks; black is the measured spectrum, red is the deconvolved peaks, (blue) is the calculated intensities, green is the background, and grey is the residual between the fit and the observed intensities.