



Supplement of

Evolution of fluid redox in a fault zone of the Pic de Port Vieux thrust in the Pyrenees Axial Zone (Spain)

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Table S1. EPMA analyses carried out on chlorites in each area (red dots in Figures 5 and 6).

		SiO ₂	TiO ₂	Al ₂ O ₃	FeO	MgO	MnO	CaO	Na ₂ O	K ₂ O	□
		Oxide wt (%)									
PPV12-07 Area1	1	27.05	0.02	23.03	20.26	17.65	0.1	0.04	0	0.04	88.19
	2	27.59	0.01	23.12	20.99	16.84	0.06	0.06	0	0.02	88.68
	3	27.39	0.03	22.57	20.53	16.68	0.12	0.05	0	0.04	87.41
	4	27.1	0.01	22.59	20.63	17.09	0.19	0.05	0.01	0.05	87.73
	5	26.91	0.03	22.64	20.36	16.91	0	0.06	0.08	0.03	87.01
	6	27.36	0.01	23.05	20.48	16.57	0.11	0.04	0	0.04	87.66
	7	26.97	0.02	23	19.95	16.9	0.02	0.04	0	0.02	86.92
	8	26.69	0	22.92	20.39	16.5	0.06	0.04	0.03	0.06	86.7
	9	27.31	0.01	22.68	19.73	17.27	0.18	0.04	0	0.03	87.25
	10	26.86	0.02	23	20.12	17.05	0.08	0.06	0	0.04	87.23
	11	26.95	0.02	23.07	19.8	17.18	0	0.05	0.01	0.04	87.12
	12	27.53	0.05	22.53	19.9	17	0.17	0.07	0.02	0.04	87.31
	13	28.04	0	22.68	19.83	16.59	0.12	0.04	0	0.09	87.4
	14	27.1	0.01	22.69	20.38	17.07	0	0.04	0.03	0.05	87.37
PPV12-07 Area2	1	27.56	0.02	22.65	19.32	17.88	0.04	0.04	0.01	0.05	87.56
	2	27.85	0.02	22.42	19.39	17.95	0.04	0.06	0	0.01	87.74
	3	27.49	0	23	20.02	16.93	0.05	0.06	0	0.05	87.59
	4	27.07	0.03	23.57	20.29	16.82	0.04	0.02	0.02	0.04	87.9
	5	26.85	0.02	23.08	19.56	17.72	0.05	0.03	0.01	0.02	87.34
	6	26.59	0.02	22.68	21.07	17.18	0.09	0.07	0	0.02	87.71
	7	26.7	0.03	22.36	20.24	17.09	0.01	0.04	0	0.02	86.48
	8	26.3	0.03	23.13	20.95	16.08	0.06	0.04	0.02	0.03	86.64
	9	26.87	0.01	22.48	20.08	17.78	0.04	0.03	0.03	0.02	87.34
	10	27.19	0.04	22.12	19.08	18.02	0.01	0.01	0.01	0.02	86.51
	11	27.1	0	22.35	19.8	17.05	0.05	0.06	0	0.02	86.42
	12	26.18	0.02	22.62	20.3	16.99	0.04	0.05	0	0.05	86.25
	13	27.38	0.01	23.22	20.37	17.11	0.06	0.03	0.01	0.01	88.2
	14	26.71	0.05	23.14	20.66	16.21	0.07	0.06	0.02	0.02	86.95
	15	27.64	0.04	22.5	19.63	16.83	0.05	0.06	0	0.02	86.77
	16	26.78	0.03	22.47	20.36	15.84	0.07	0.09	0	0.04	85.68
	17	27.19	0	23.1	20.44	16.24	0.05	0.1	0	0.04	87.16
PPV12-05 Area1	1	25.94	0.03	22.79	23.69	14.55	0.03	0.05	0	0.01	87.09
	2	26.74	0.03	22.82	23.01	14.45	0.03	0.06	0	0.02	87.16
	3	27.51	0.02	22.03	21.2	16.77	0.04	0.07	0	0	87.64
	4	27.35	0	21.98	21.78	16.09	0.05	0.06	0.04	0.02	87.37
	5	26.41	0.01	22.28	23.87	14.79	0.03	0.04	0.01	0.02	87.46
PPV12-05 Area2	1	26.42	0	22.97	22.14	14.86	0.03	0.04	0	0	86.46
	2	26.62	0.01	22.55	21.11	15.67	0.05	0.1	0.02	0.04	86.16
	2	26.72	0.04	22.64	21.89	15.21	0.04	0.06	0	0.02	86.62
	4	26.43	0.01	22.47	21.54	15.26	0.04	0.07	0	0.04	85.86
	5	26.09	0.02	21.99	23.14	14.85	0.06	0.08	0.05	0.01	86.29

Table S2. XANES data obtained on chlorite in each area (blue points on Figures 5 and 6).

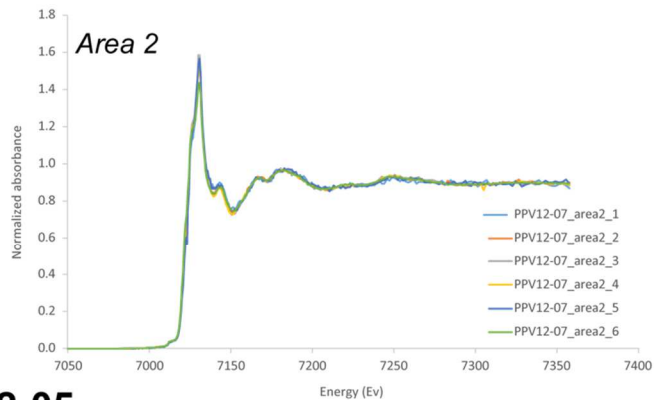
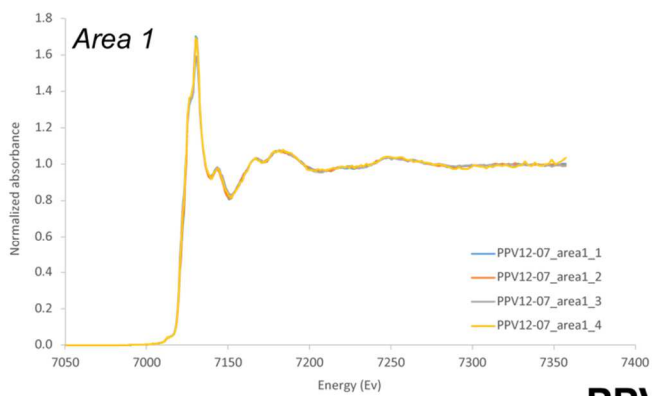
		Centroid energy (eV)	Integrated pre-edge intensity	XFe ³⁺
PPV12-07 Area1	1	7113.53	0.1174	0.30
	2	7113.62	0.1054	0.36
	3	7113.51	0.1110	0.29
	4	7113.48	0.1133	0.27
<i>Mean value</i>				<i>0.31</i>
<i>St Dev</i>				<i>0.04</i>
PPV12-07 Area2	1	7113.58	0.1202	0.34
	2	7113.55	0.1134	0.32
	3	7113.58	0.1034	0.34
	4	7113.43	0.1140	0.24
	5	7113.68	0.1001	0.41
	6	7113.53	0.1080	0.30
<i>Mean value</i>				<i>0.32</i>
<i>St Dev</i>				<i>0.06</i>
PPV12-05 Area1	1	7113.58	0.0924	0.33
	2	7113.80	0.1171	0.49
	3	7113.51	0.1053	0.29
	4	7113.64	0.0958	0.37
	5	7113.77	0.1192	0.47
<i>Mean value</i>				<i>0.39</i>
<i>St Dev</i>				<i>0.09</i>
PPV12-05 Area2	1	7113.12	0.0988	0.07
	2	7113.39	0.1204	0.22
	3	7113.23	0.0991	0.12
	4	7113.42	0.1241	0.23
	5	7113.29	0.0998	0.16
	6	7113.29	0.0998	0.16
<i>Mean value</i>				<i>0.16</i>
<i>St Dev</i>				<i>0.07</i>

Table S3. Structural formulae of newly formed chlorite calculated by coupling μ -XANES and microprobe results.

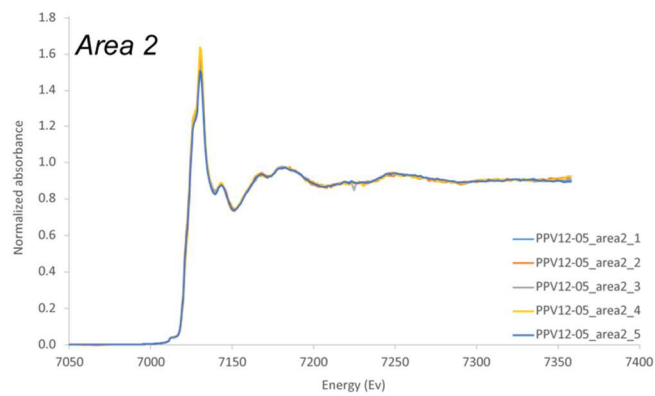
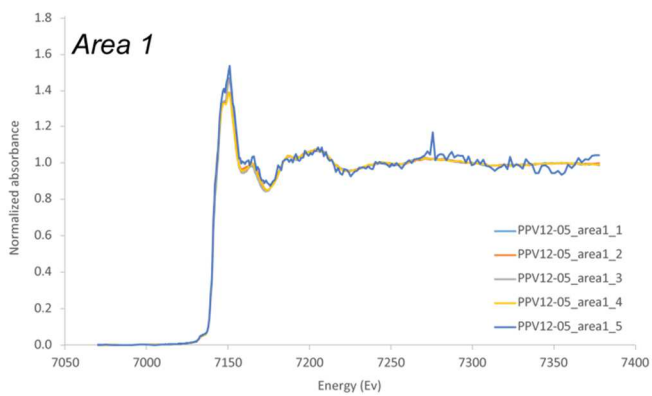
		Tetrahedral layer			Octahedral layer					
		Si	^{IV} Al	^{VI} Al	Fe ²⁺	Fe ³⁺	Fe _{total}	Mg	Mn	□ Octa
PPV12-07 Area1	1	2.74	1.26	1.49	1.18	0.53	1.72	2.66	0.01	5.88
	2	2.78	1.22	1.53	1.22	0.55	1.77	2.53	0	5.84
	3	2.8	1.2	1.52	1.21	0.54	1.76	2.54	0.01	5.83
	4	2.77	1.23	1.48	1.22	0.55	1.76	2.6	0.02	5.86
	5	2.76	1.23	1.51	1.21	0.54	1.75	2.59	0	5.85
	6	2.79	1.21	1.55	1.2	0.54	1.74	2.52	0.01	5.82
	7	2.76	1.23	1.54	1.18	0.53	1.71	2.58	0	5.84
	8	2.75	1.25	1.54	1.21	0.55	1.76	2.54	0.01	5.84
	9	2.79	1.21	1.52	1.16	0.52	1.68	2.63	0.02	5.84
	10	2.75	1.25	1.52	1.19	0.53	1.72	2.6	0.01	5.85
	11	2.75	1.24	1.54	1.17	0.52	1.69	2.62	0	5.85
	12	2.81	1.19	1.52	1.17	0.53	1.7	2.59	0.01	5.82
	13	2.85	1.15	1.57	1.16	0.52	1.69	2.51	0.01	5.78
	14	2.77	1.23	1.51	1.2	0.54	1.74	2.6	0	5.85
<i>Mean Value</i>		2.78	1.22	1.52	1.19	0.54	1.73	2.58	0.01	5.84
<i>St Dev</i>		0.03	0.03	0.02	0.02	0.01	0.03	0.05	0.01	0.02
PPV12-07 Area2	1	2.79	1.2	1.5	1.11	0.52	1.64	2.7	0	5.84
	2	2.82	1.18	1.49	1.12	0.52	1.64	2.71	0	5.84
	3	2.79	1.21	1.55	1.16	0.54	1.7	2.57	0	5.82
	4	2.75	1.25	1.57	1.17	0.55	1.72	2.54	0	5.84
	5	2.74	1.26	1.51	1.13	0.53	1.67	2.69	0	5.87
	6	2.72	1.28	1.46	1.23	0.58	1.8	2.62	0.01	5.9
	7	2.76	1.24	1.49	1.19	0.56	1.75	2.63	0	5.87
	8	2.72	1.27	1.55	1.23	0.58	1.81	2.48	0.01	5.85
	9	2.75	1.25	1.46	1.17	0.55	1.72	2.71	0	5.89
	10	2.79	1.21	1.47	1.11	0.52	1.64	2.76	0	5.86
	11	2.79	1.21	1.51	1.16	0.55	1.71	2.62	0	5.84
	12	2.72	1.28	1.49	1.2	0.56	1.76	2.63	0	5.89
	13	2.77	1.23	1.54	1.17	0.55	1.72	2.58	0.01	5.84
	14	2.75	1.25	1.56	1.21	0.57	1.78	2.49	0.01	5.83
	15	2.83	1.17	1.55	1.14	0.54	1.68	2.57	0	5.8
	16	2.79	1.2	1.56	1.21	0.57	1.78	2.46	0.01	5.81
	17	2.78	1.22	1.57	1.19	0.56	1.75	2.48	0	5.81
<i>Mean Value</i>		2.77	1.23	1.52	1.17	0.55	1.72	2.6	0	5.85
<i>St Dev</i>		0.03	0.03	0.04	0.04	0.02	0.06	0.09	0	0.03
PPV12-05 Area1	1	2.71	1.28	1.53	1.26	0.81	2.07	2.27	0	5.87
	2	2.78	1.22	1.57	1.22	0.78	2	2.24	0	5.81
	3	2.81	1.18	1.47	1.11	0.71	1.81	2.56	0	5.85
	4	2.82	1.18	1.49	1.14	0.73	1.88	2.47	0	5.84
	5	2.75	1.25	1.49	1.27	0.81	2.08	2.3	0	5.87
<i>Mean Value</i>		2.78	1.22	1.51	1.2	0.77	1.97	2.37	0	5.85
<i>St Dev</i>		0.04	0.04	0.04	0.07	0.05	0.12	0.14	0	0.02
PPV12-05 Area2	1	2.76	1.24	1.58	1.62	0.31	1.93	2.31	0	5.83

	2	2.77	1.22	1.55	1.55	0.29	1.84	2.43	0	5.82
	3	2.78	1.22	1.56	1.6	0.3	1.9	2.36	0	5.82
	4	2.77	1.23	1.55	1.59	0.3	1.89	2.39	0	5.83
	5	2.75	1.25	1.49	1.71	0.33	2.04	2.33	0.01	5.87
<i>Mean Value</i>		2.77	1.23	1.54	1.61	0.31	1.92	2.36	0	5.83
<i>St Dev</i>		0.01	0.01	0.04	0.06	0.01	0.07	0.05	0	0.02

PPV12-07



PPV12-05

Figure S1. μ -XANES Spectra.