

APPENDIX 1

**Comparison of X-ray powder diffraction data of the precipitates used in the experiments (this study) with standard vanadinite and chervetite**

Synthetic vanadinite (this study)		Vanadinite (Dai and Hughes, 1989)		Residuum of 9-year-long dissolution experiment of vanadinite at pH = 3.0		Chervetite (Shannon and Calvo, 1973)	
2θ	Intensities	2θ	Intensities	2θ	Intensities	2θ	Intensities
17.13	7	17.19	7.83	17.14	10	-	-
-	-	-	-	17.73	4	17.90	6.98
-	-	-	-	17.95	57.75	17.94	61.74
19.82	20	19.87	24.21	19.82	29	-	-
-	-	-	-	20.45	9	20.49	37.88
20.98	27	21.05	32.90	21.00	30	-	-
-	-	-	-	21.37	6	21.43	4.71
23.24	4	23.31	4.89	23.22	5	-	-
24.18	8	24.26	7.66	24.17	5	24.20	1.66
-	-	-	-	24.77	14	24.81	60.57
-	-	-	-	25.80	22	25.83	100
-	-	-	-	25.93	15	25.97	66.96
-	-	26.26	26.22	26.16	14	-	-
26.27	38	26.39	17.03	26.34	29	-	-
-	-	26.39	18.84	27.22	4	27.23	18.70
-	-	-	-	27.71	29	27.76	85.59
-	-	-	-	27.96	4	28.05	15.91
-	-	-	-	28.11	10	28.11	1.48
-	-	-	-	28.44	46	28.54	1.02
-	-	-	-	28.85		28.85	58.84
29.03	94	29.11	45.76	29.04	100	-	-
-	-	29.11	54.24	29.80	65	29.79	36.81
-	-	-	-	29.87		29.87	5.14
29.93	100	29.88	95.04	29.94	28	30.00	31.33
-	-	30.00	53.24	30.44	6	30.49	12.83
-	-	-	-	31.22	6	31.27	30.45
31.46	1	31.55	1.22	31.49	4	31.48	13.05
32.37	1	32.44	1.45	-	-	-	-
-	-	-	-	32.55	8	32.59	28.12
-	-	-	-	32.85	7	32.91	41.21
-	-	-	-	33.02	5	33.05	27.44
34.71	3	34.78	2.89	34.67	5	-	-
-	-	-	-	35.61	6	35.61	23.04
36.05	3	36.15	2.01	35.99	4	36.03	5.35

-	-	-	-	37.13	4	37.16	3.64
38.27	1	38.34	1.27	38.25	4	38.26	10.57
38.85	6	38.95	5.55	38.85	6	-	-
-	-	-	-	39.56	5	39.59	17.94
40.27	5	40.38	5.48	40.27	13	40.31	23.01
40.71	9	40.83	10.66	40.71	7	-	-
-	-	-	-	41.30	4	41.30	12.57
-	-	-	-	42.46	5	42.52	2.07
-	-	-	-	-	-	42.53	17.04
42.75	33	42.86	35.78	42.75	29	42.75	10.67
-	-	-	-	43.26	8	43.25	6.17
-	-	-	-	43.72	5	43.76	2.61
44.02	18	44.10	3.93	44.01	15	44.11	8.89
-	-	44.10	12.51	-	-	-	-
-	-	-	-	45.16	4	45.16	21.67
-	-	-	-	45.69	13	45.58	5.97
45.74	28	45.81	17.15	45.85	13	45.80	5.89
-	-	45.81	11.10	-	-	45.89	15.87
46.47	21	46.58	8.28	46.47	20	46.41	5.12
-	-	46.58	16.55	-	-	-	-
-	-	-	-	47.30	36	47.32	7.21
47.54	25	47.66	28.52	47.55	21	-	-
-	-	-	-	48.08	4	48.13	6.31
49.55	12	49.70	12.99	49.56	11	49.58	2.54
-	-	-	-	-	-	49.58	2.99
50.93	2	51.04	1.69	50.94	4	-	-
52.44	2	52.57	1.21	-	-	-	-
-	-	-	-	52.81	5	52.80	1.36

The XRD patterns were collected with a *Philips PW 3020 X'Pert-APD* diffractometer system (with Cu anode and graphite monochromator) using a step-scan mode at a step size of 0.02 2 $\theta$  and a rate of 1s per step