

Hydrous silica coatings: Occurrence, Speciation of Metals and Environmental Significance

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**Table S1: Element concentrations of the tailings pond and
detection limits (detect.) for diluted (dilut.)and undiluted (undilut.) solutions**

Physicochemical Conditions	pH 2.6	Eh [mV] 466.5 mV				Conductivity [ms cm^{-1}] 4.35 mS cm^{-1}						
	Li	Be	B	Na	Mg	Al	Si	Cl	Ca	Sc	Ti	V
Concentration	77	0.8	171	90	129	20	21	132	409	2	1	0.39
Unit	ppb	ppb	ppb	ppm	ppm	Ppm	ppm	ppm	ppm	ppb	ppb	ppb
Detect. (Dilut.)	0.1	0.1	26	0.1	0.01	0.05	0.10	0.3	0.25	1	1	0.03
Detect. (Undilut.)	0.01	0.01	2.6	0.01	0.001	0.005	0.001	0.03	0.03	0.1	0.1	0.003
	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	As	Se	Rb	Sr
Concentration	29	4561	204	956	39	3145	838	5	2.2	3	39.1	1016
Unit	ppb	ppb	ppm	ppb	ppm	ppb	ppb	ppb	ppb	Ppb	ppb	ppb
Detect. (Dilut.)	0.2	30	0.03	0.05	0.01	2	10	0.02	0.3	2	0.05	1
Detect. (Undilut.)	0.02	3	0.003	0.005	0.001	0.2	1	0.002	0.03	0.2	0.005	0.1
	Y	Zr	Nb	Mo	Ru	Ag	Cd	Sn	Sb	Cs	Ba	La
Concentration	283	N.D.	N.D.	N.D.	0.1	0.1	11.4	N.D.	0.1	0.89	N.D.	439
Unit	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Detect. (Dilut.)	0.005	1	0.01	0.1	0.01	0.05	0.1	0.1	0.1	0.005	0.2	0.01
Detect. (Undilut.)	0.001	0.1	0.001	0.01	0.001	0.005	0.01	0.01	0.01	0.001	0.02	0.001
	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb
Concentration	910	101	393	71	14	73	10	54	10	25	3	16
Unit	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Detect. (Dilut.)	0.02	0.004	0.03	0.01	0.004	0.001	0.01	0.01	0.001	0.01	0.001	0.01
Detect.(Undilut.)	0.002	0.001	0.003	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
	Lu	Hf	Ta	W	Re	Au	Tl	Pb	Bi	Th	U	
concentration	2	0.3	N.D.	0.2	2	N.D.	0.03	0.06	N.D.	12	33	
Unit	Ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	
Detect. (Dilut.)	0.001	0.04	0.003	0.1	0.01	0.04	0.01	0.02	0.5	0.01	0.002	
Detect. (Undilut.)	0.001	0.004	0.001	0.01	0.001	0.004	0.001	0.002	0.05	0.001	0.001	

Table S2. Pass Energies (PE) and Aperture (Ap) of the XPS measurements

Compound	PE / Ap
Silicic Acid, H_2SiO_3	80/110
<i>Silica</i> coating, green zone	160/110
<i>Hydrous silica</i> coating, Brown zone	80/110
Olivine	80/110

Table S3. Number of assigned mole (H_2O) per mole Si, Fe and S in the normalization calculations to quantify the LA-ICPMS data

Zones	Phases and their composition as oxides	No. of H_2O per mole Fe	No. of H_2O per mole Si	No. of H_2O per mole S
Brown zone: All coatings	Schwertmannite, $4\text{Fe}_2\text{O}_3$, $1.8(\text{SO}_3)$, $10.6(\text{H}_2\text{O})$ Hydrous silica, $\text{SiO}_2(\text{H}_2\text{O})_n$	1	1	1
Green zone: <i>Jarosite</i> <i>Silica</i> <i>Microcoatings</i>	Jarosite, $0.5\text{K}_2\text{O}$, $1.5\text{Fe}_2\text{O}_3$, 2SO_3 , $3\text{H}_2\text{O}$ Opaline-type silica, $\text{SiO}_2(\text{H}_2\text{O})_n$	1	0.5	--
Green zone: Gypsum	Gypsum, CaO , SO_3 $2(\text{H}_2\text{O})$ Opaline-type silica, $\text{SiO}_2(\text{H}_2\text{O})_n$	1	0.5	2