

Reprocessing of the waste produced during acid mine drainage lime treatment by selective leaching

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Table S1 Operating conditions and results of leaching tests in reactors

Test	Volume (L)	Solid content (% m/m)	Acid rate (g.H ₂ SO ₄ .kg ⁻¹)	Duration (h)	Initial pH	Final pH	Mass balance*		LY _{liquid} (%)			LY _{solid} (%)			
							Zn (%)	Cu (%)	Zn	Cu	Cd	Zn	Cu	Fe	
R1	0.5	0.72	157	24	1.7	3.0			78	80					
R2	0.5	0.74	157	24	2.2	5.4			37	8					
R3	0.5	0.78	157	24	1.8	2.9			75	78					
R4	2	0.70	150	24	1.8	3.4			77	76					
R5	2	0.70	175	48	1.8	3.0			79	84					
R6	2	0.70	201	48	1.8	2.8			81	84	96				
R7	2	0.68	251	48	1.7	2.5			81	90					
R8	2	0.76	449	24	1.5	2.0			84	91	100 ¹				
R9	2	0.70	348	24	1.5	2.3			82	89	97				
R10	2	2.9	199	24	1.3	2.5	-6	-9	78	71		86	82	18	
R11	2	2.8	449	24	0.9	1.6	-4	-4	87	86		93	92	62	
R12	2	2.8	650	24	0.8	1.2	-5	-5	87	87		94	93	65	
R13	2	4.5	199	24	1.1	2.5	-1	-1	87	83		89	85	38	
R14	2	8.6	201	24	0.9	2.4	-1	-2	88	82		89	84	42	
R15	2	16	200	24	0.5	2.4	0	2	84	82		84	80	27	
R16	2	2.9	200	24	1.3	2.5	0	1	87	85		88	86	23	

¹ Due to minor inaccuracies in analysis and mass balance, some values slightly exceeded 100%. To provide a realistic and accurate representation, we have adjusted these values to a maximum of 100%, acknowledging the inherent experimental uncertainties.

R17	2	3.0	200	24	1.2	2.5	-7	-6	80	78	89	86	22
R18	2	0.76	201	24	1.7	2.7			77	80	100		

*Calculated as: $\frac{\text{mass at } t_{0_{\text{solid phase}}} - \text{mass at } t_{f_{\text{liquid phase}}} - \text{mass at } t_{f_{\text{solid phase}}}}{\text{mass at } t_{0_{\text{solid phase}}}} \times 100\%$

Table S2 Operating conditions and results of leaching tests in 150-mL shake flasks

Test	Total leaching time (h)	Solid content (% m/m)	Acid rate (g.H ₂ SO ₄ .kg ⁻¹)	Initial pH	Final pH	LY_liquid (%)		
						Zn	Cu	Fe
T1	24	1.09	43	2.7	3.6	75	66	< 0.5
T2	5.3	1.28	93	2.4	3.5	67	57	0.3
T3	24	1.28	133	3.4	3.6	75	70	< 0.5
T4	5.3	0.66	106	2.6	3.5	77	64	0.20
T5	5.3	0.79	118	3.2	3.5	77	71	0.30

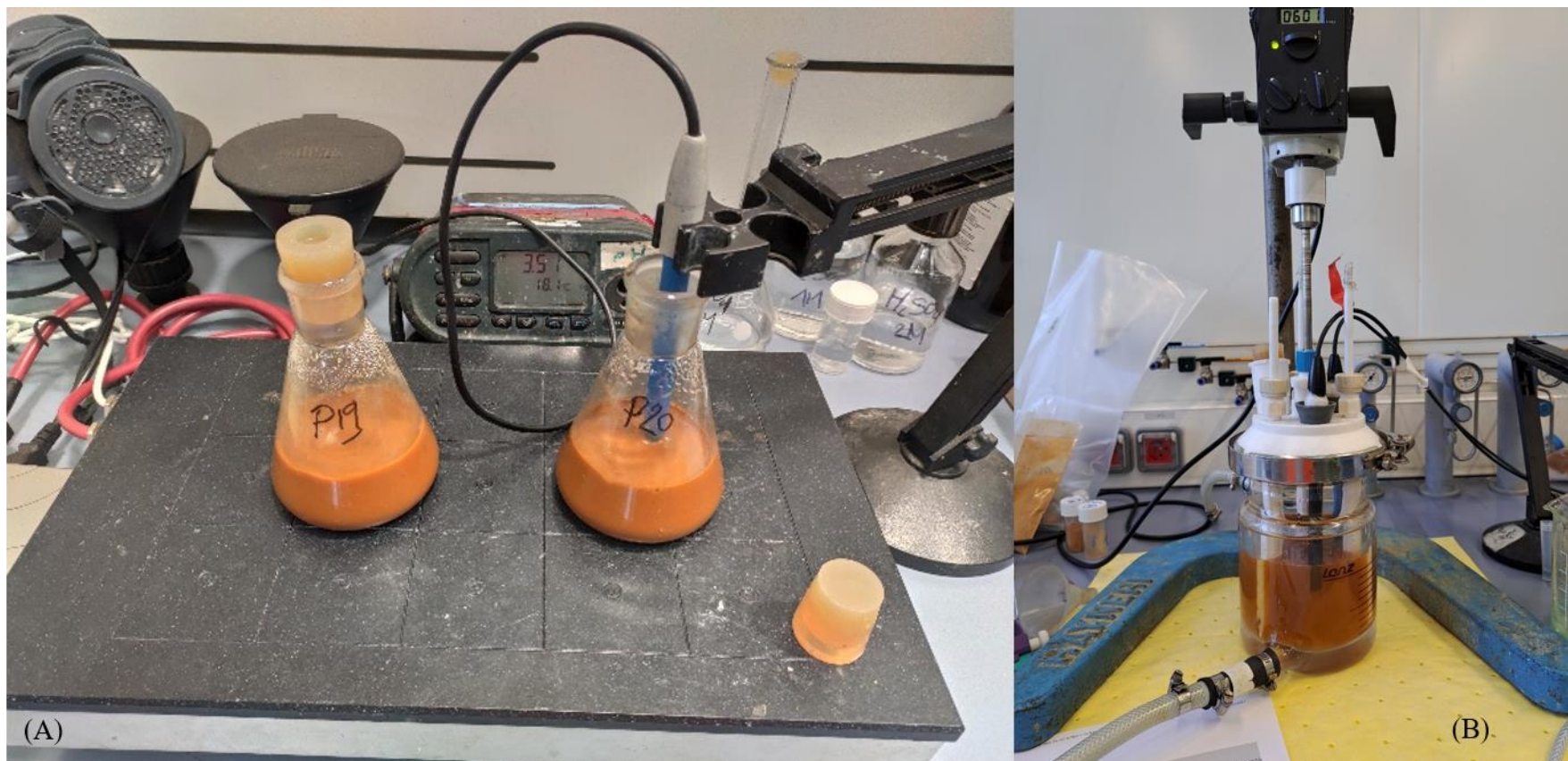


Figure S1 photograph of the 150 mL experimental set-up (A) and 0.5 L STR reactor (B)

2-Theta - Scale

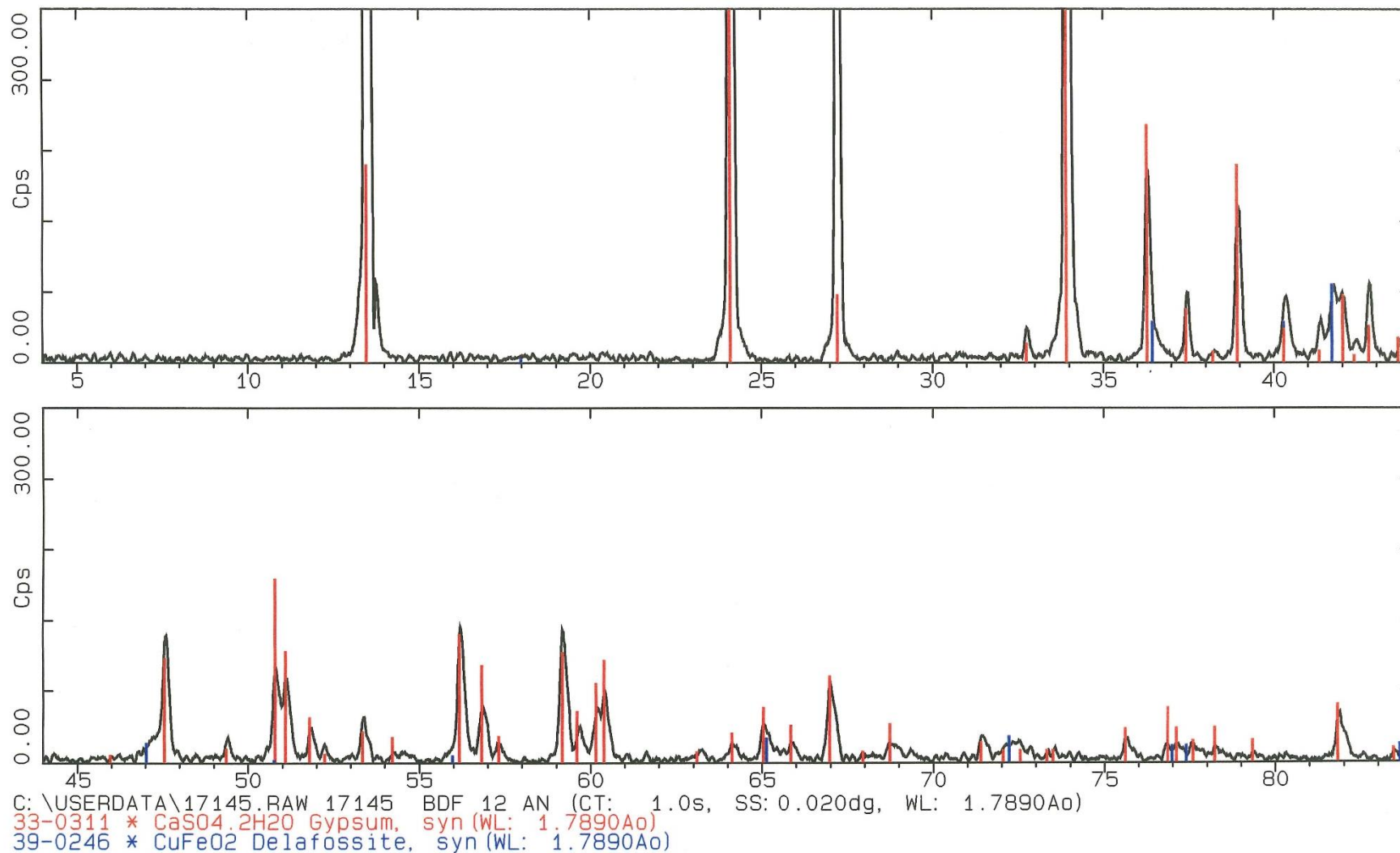


Figure S2 XRD diffractograms of a Delafossite-rich sample

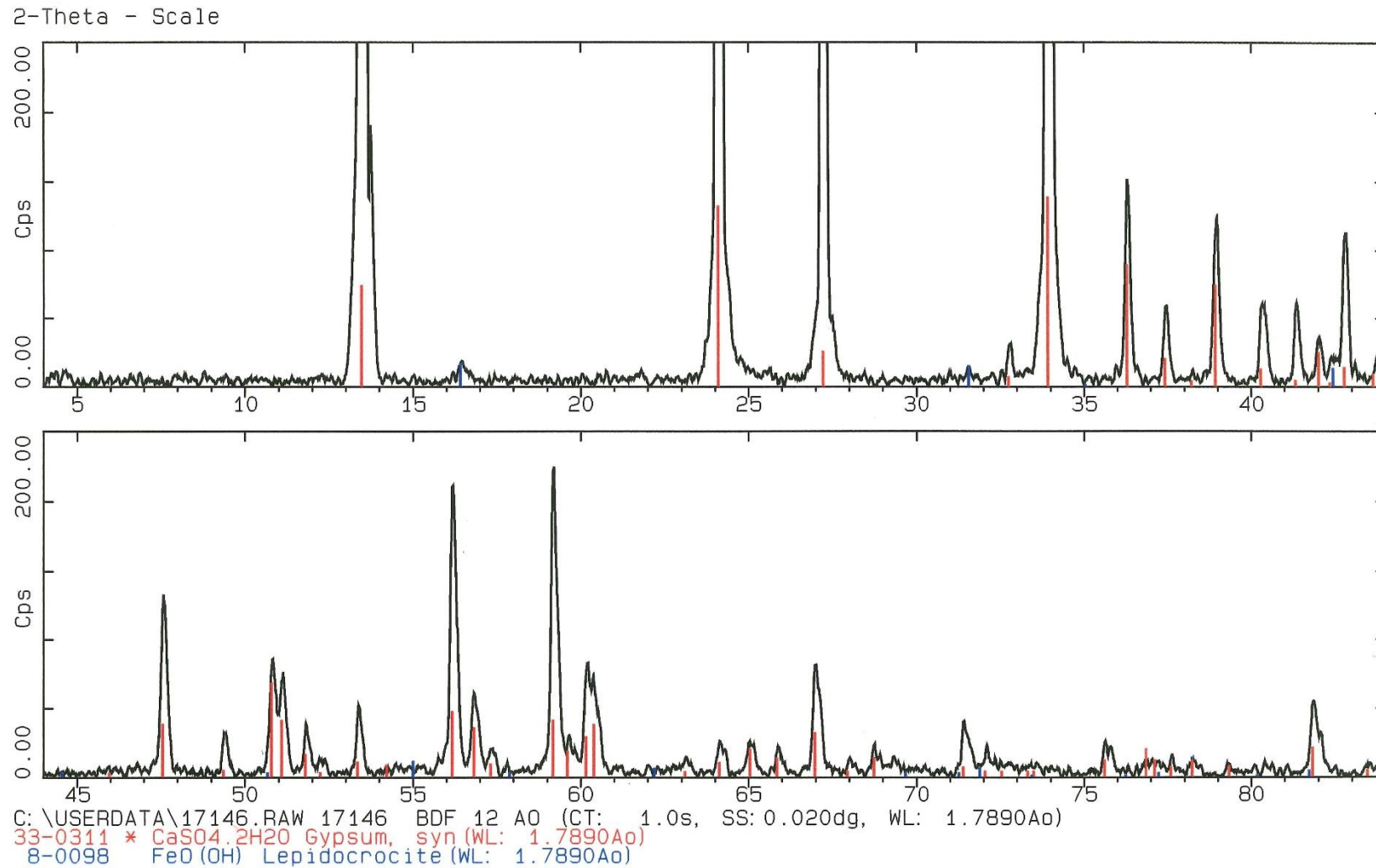


Figure S3 XRD diffractograms of a Lepidocrocite-rich sample

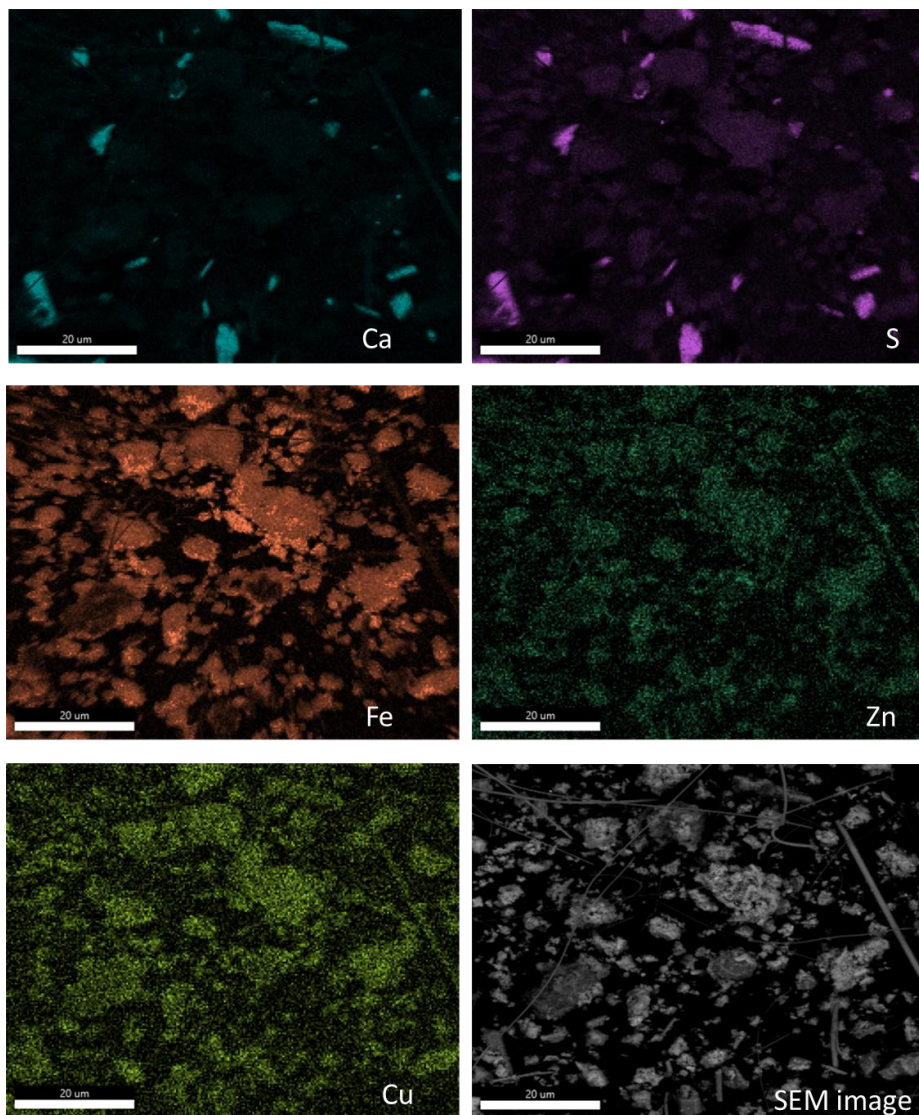


Figure S4 EDS-SEM mapping of sludge after leaching at $150 \text{ g}_{\text{acid}}/\text{kg}_{\text{solid}}$ and 0.7% solid load

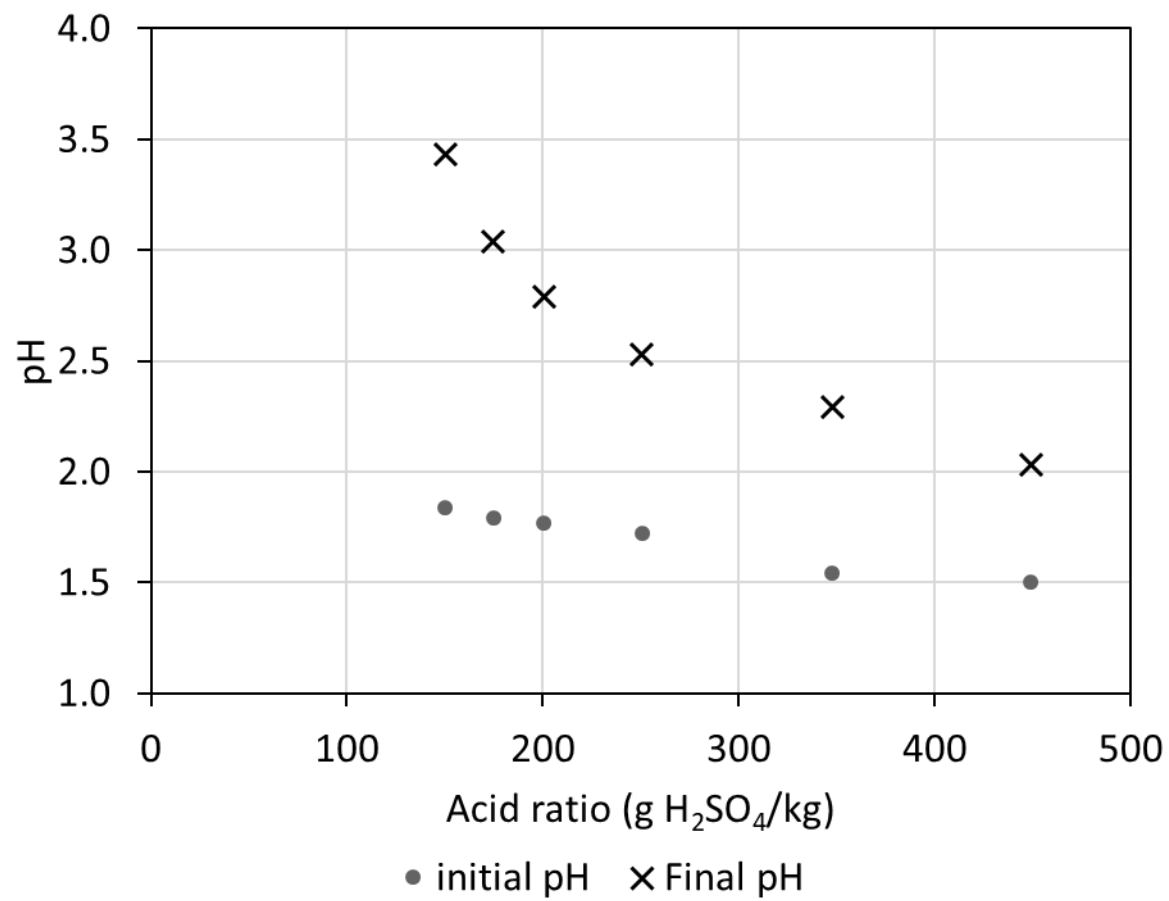


Figure S5 initial and final pH as different acid to solid ratio in STRs for low solid contents (from 0.7% to 1.3% m/m)

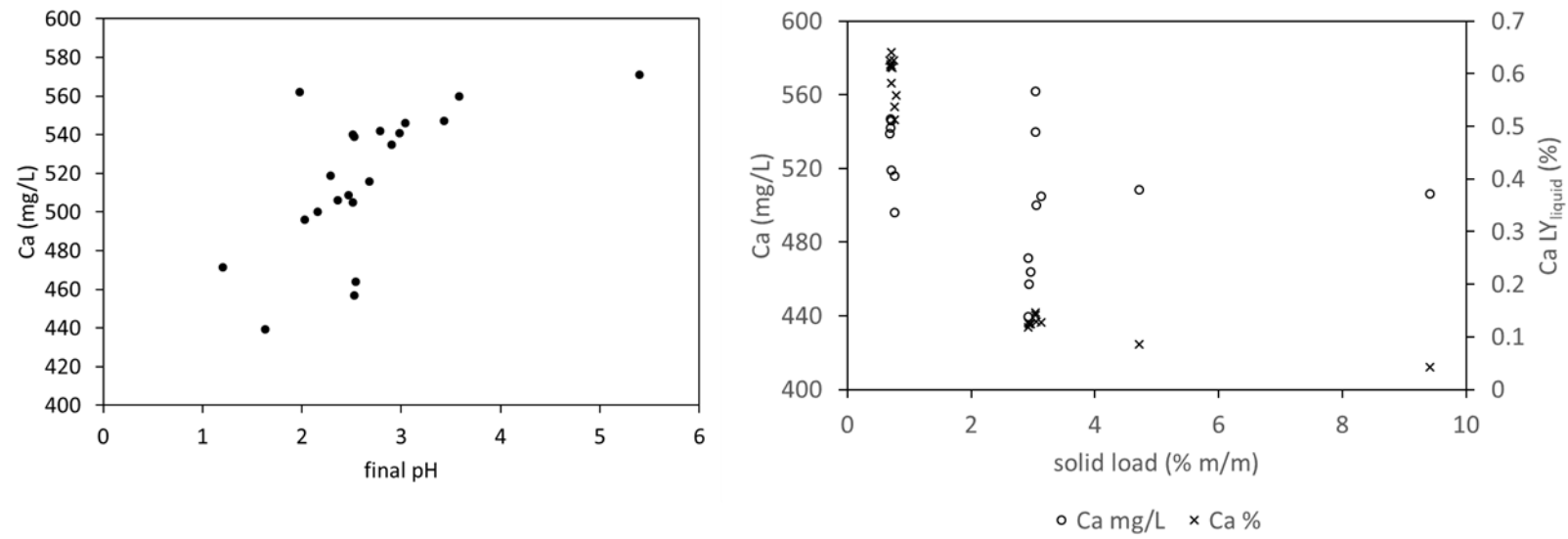


Figure S6 Ca concentration vs final pH (A) and Ca concentration and Ca LY_{liquid} versus solid load (B)