

Chemical Clogging and Evolution of Head Losses in Steel Slag Filters Used for Phosphorus Removal

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Table S1. Measurement of the hydraulic conductivity of column 2 at $t = -1$ d using a constant head protocol. The hydraulic conductivity was calculated using the pressure head observed between cells 1 and 9 at a fixed influent flow rate, using tap water as influent. Q: influent flow rate, Δh : head between cell 1 and 9, ΔL : distance between cell 1 and 9, A: area of the column, K: hydraulic conductivity calculated with $K = \frac{Q\Delta L}{A\Delta H}$ (Darcy's law).

Test	Q	Δh	ΔL	A	K
	mL/min	cm	cm	cm ²	m/s
1	70.4	0.25	120	78.54	7.06×10^{-2}
2	41.2	0.13	120	78.54	8.26×10^{-2}
3	39.4	0.13	120	78.54	7.90×10^{-2}
4	28.9	0.06	120	78.54	1.16×10^{-1}
5	24.2	0.05	120	78.54	1.21×10^{-1}
6	17.6	0.08	120	78.54	5.88×10^{-2}
7	12.1	0.03	120	78.54	1.21×10^{-1}
mean					9.28×10^{-2}

Note: the column was kept saturated, but no precaution was made to ensure full saturation (e.g. no use of unaerated water, no measurement of the saturation level).



Figure S1. Precipitate sampling by washing and sedimentation in a pan.

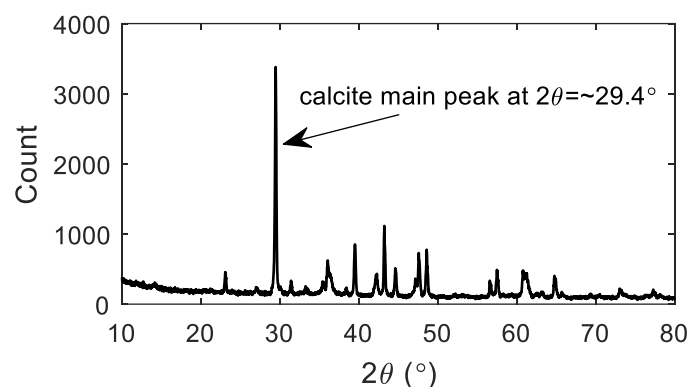


Figure S2. XRD pattern of precipitates sampled in column 2, cell 1. Note: the absence of contamination by slag dust in the XRD pattern was validated by producing a control XRD pattern composed of clean slag dust. The control XRD pattern did not show any peaks associated with calcite or hydroxyapatite (results not shown).

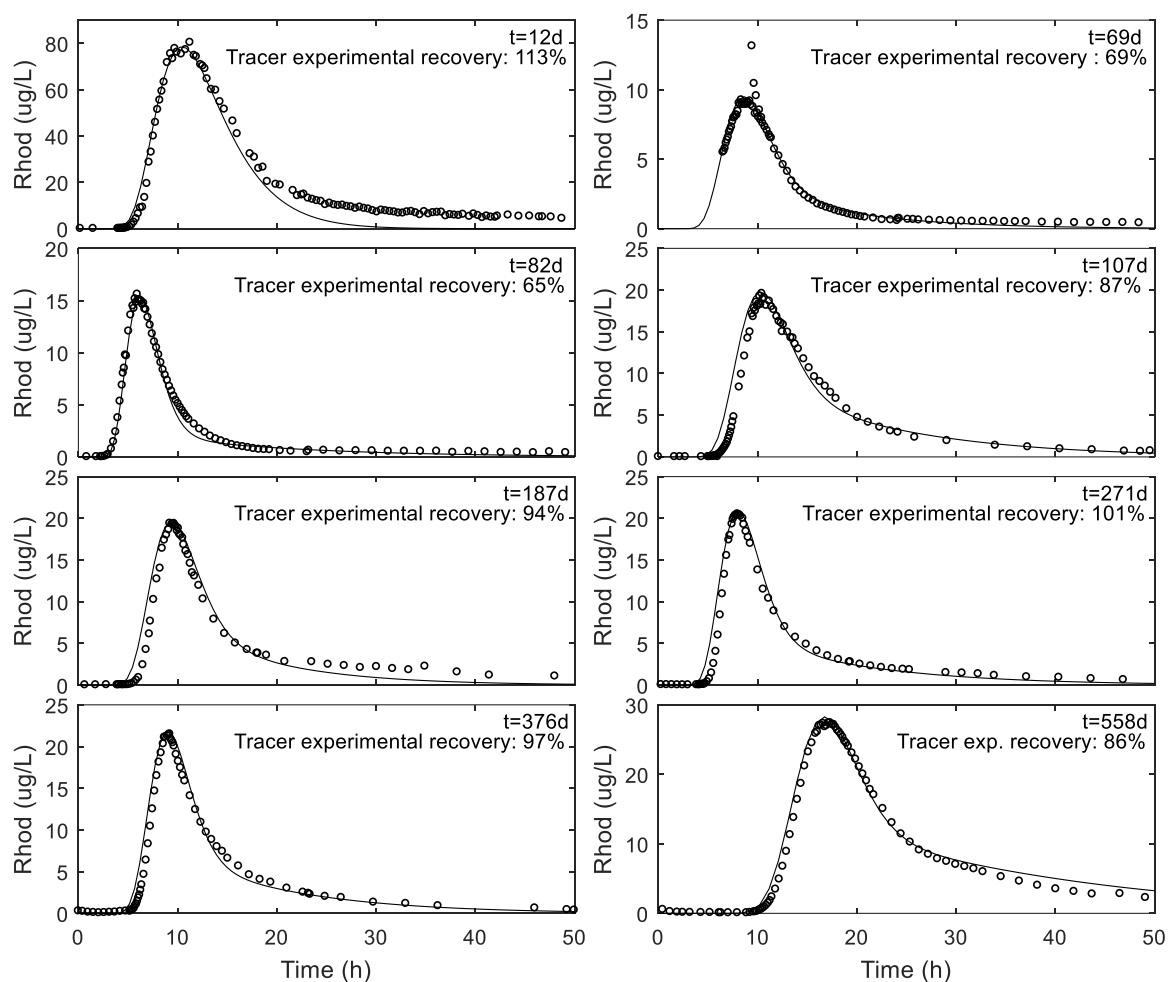


Figure S3. Tracer test calibration in column 1 at different times of operation (indicated at the top right corner). Tracer experimental recovery is indicated at the top right for each tracer test.

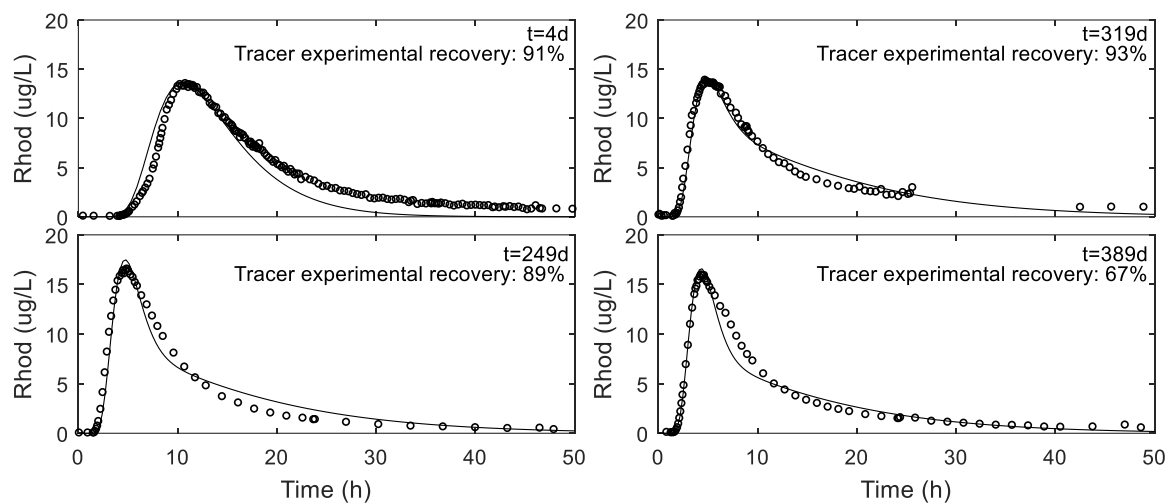


Figure S4. Tracer test calibration in column 2 at different times of operation (indicated at the top right corner). Tracer experimental recovery is indicated at the top right for each tracer test.

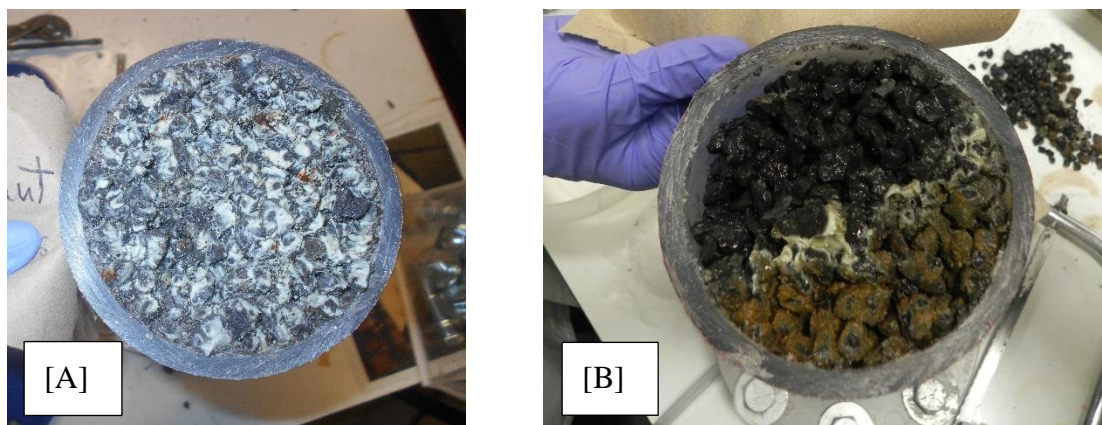


Figure S5. Pictures of column cross-sections at the interface between cells 2 and 3. **A:** column 1, showing black slag with a uniform distribution of white precipitates. **B:** column 2, showing irregular distribution of precipitation into zones of either black slag with few precipitates, or red slag with heavy cementation.

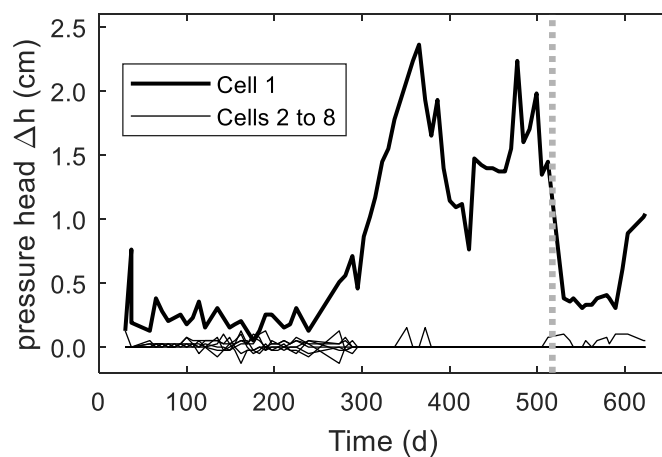


Figure S6. Pressure head buildup in column 1. The vertical dashed line indicates the reduction of influent flowrate from 6.9 ± 1.3 mL/min to 3.4 ± 0.5 mL/min.