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**Supplementary material**

# Effects of pH value, chloride and sulfate concentrations on galvanic corrosion between lead and copper in drinking water

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**Table S1. SEM-EDX results of scales collected after 7 days in completely mixed conditions at pH 7.0**

| Conditions | 250 mg $L^{-1}$ $Cl^-$ | | 250 mg $L^{-1}$ $SO_4^{2-}$ | | 250 mg $L^{-1}$ $Cl^-$ and 250 mg $L^{-1}$ $SO_4^{2-}$ | |
|---|---|---|---|---|---|---|
| Element | Weight % | Atomic % | Weight % | Atomic % | Weight % | Atomic % |
| C | 13.83 | 49.35 | 21.87 | 52.53 | 18.57 | 55.60 |
| O | 12.61 | 33.75 | 21.27 | 38.35 | 13.91 | 31.22 |
| S | 0.01 | 0.01 | 0.73 | 0.66 | 0.16 | 0.18 |
| Cl | 1.09 | 1.32 | 0.59 | 0.48 | 1.56 | 1.58 |
| Cu | 1.25 | 0.85 | 0.57 | 0.26 | 0.01 | 0.01 |
| Pb | 71.20 | 14.72 | 54.7 | 7.62 | 65.79 | 11.42 |

 

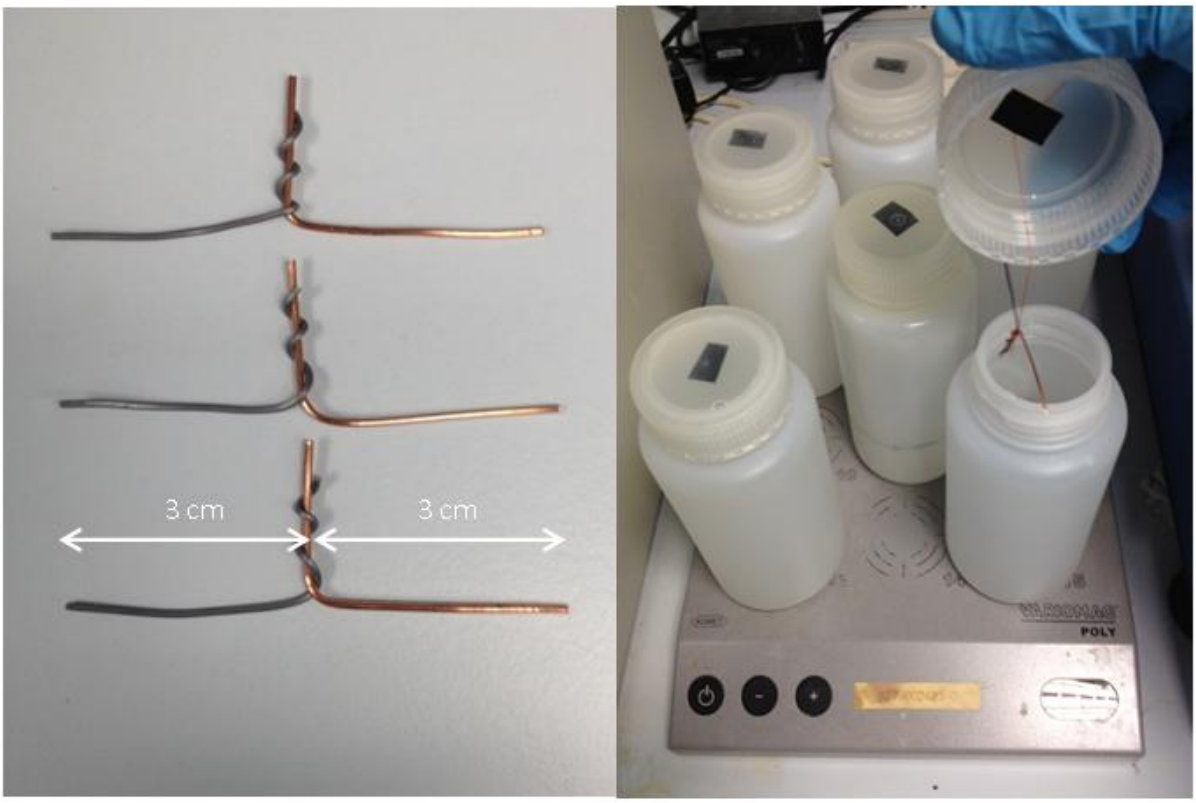


**Fig. S1.** Photographs of experimental setup. Lead wire tied round copper wire (left) and the wires are suspended in plastic bottle with a polyester thread (right).

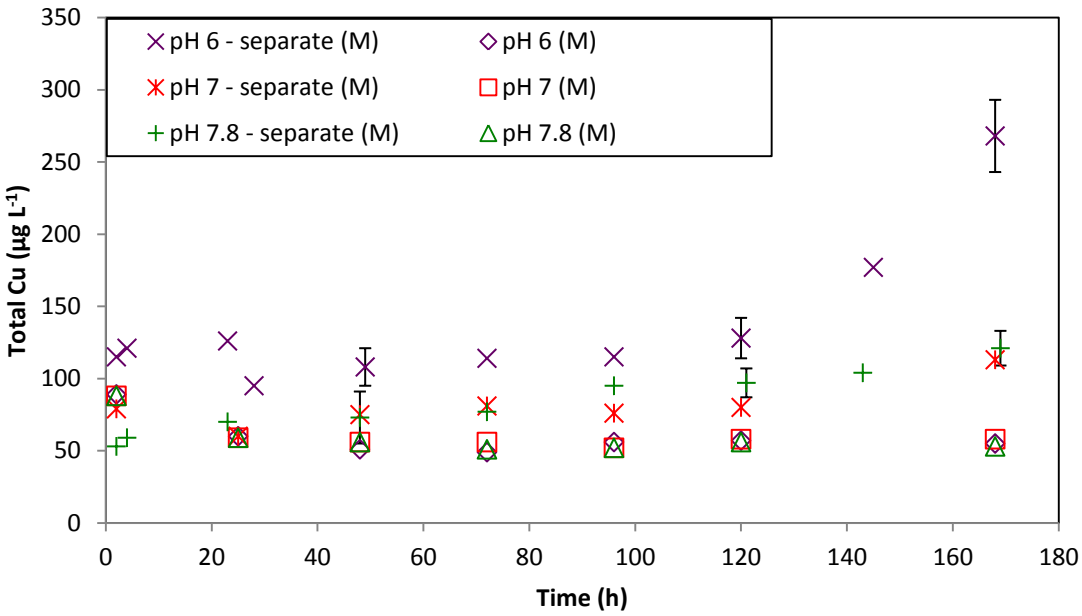


**Fig. S2.** Total copper as a function of time at different pH values under completely mixed conditions (M). Error bars represent standard deviation.

 

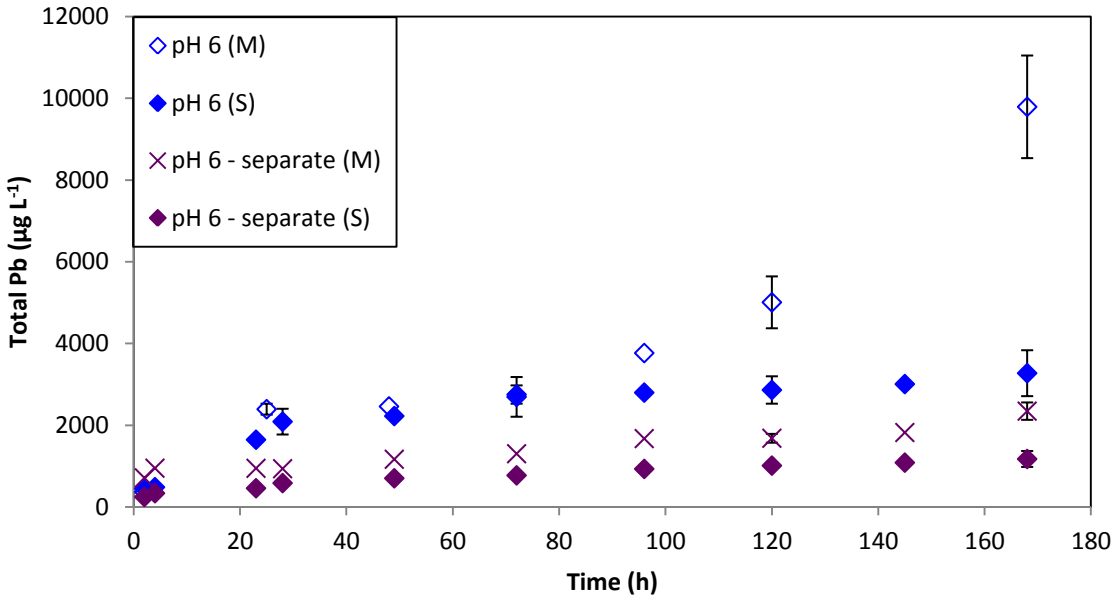


**Fig. S3.** Total lead as a function of time at pH 6.0. S, stagnant; M, completely mixed.

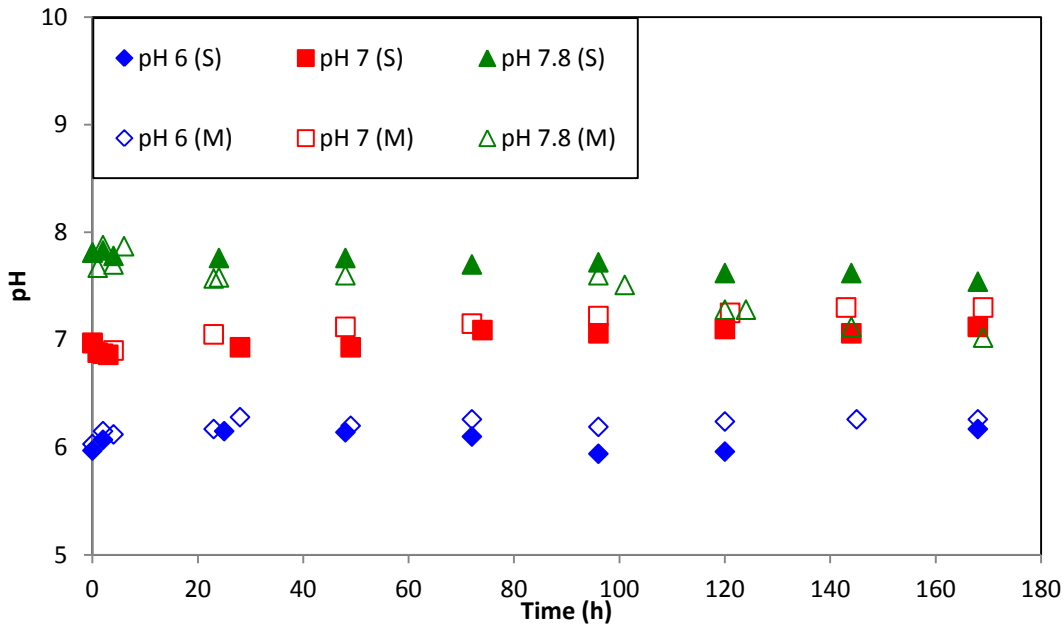


**Fig. S4.** Solution pH as a function of time at different solution pH. S, stagnant; M, completely mixed.

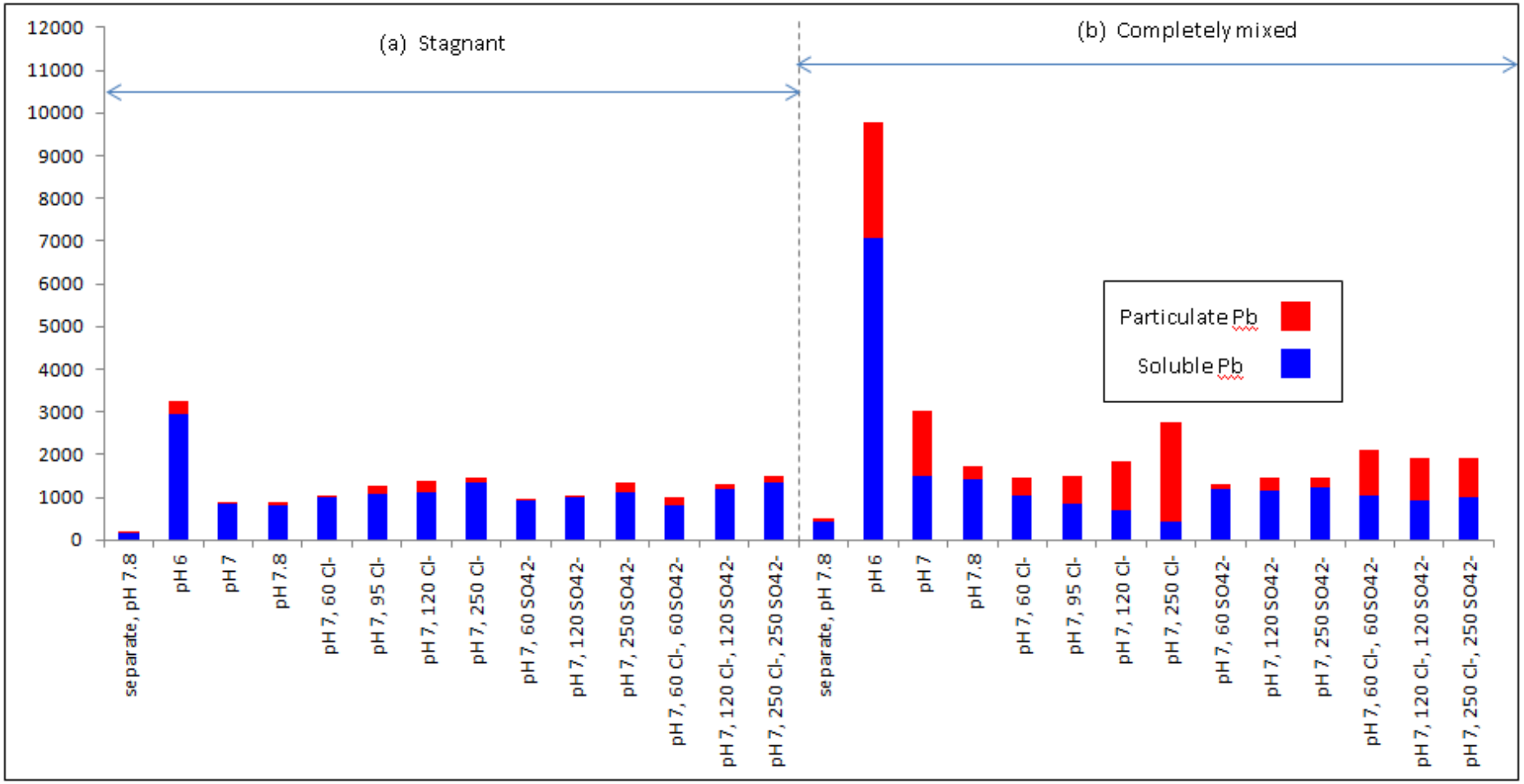


**Fig. S5.** Summary of total lead release under (a) stagnant and (b) completely mixed conditions after 7 days.

 

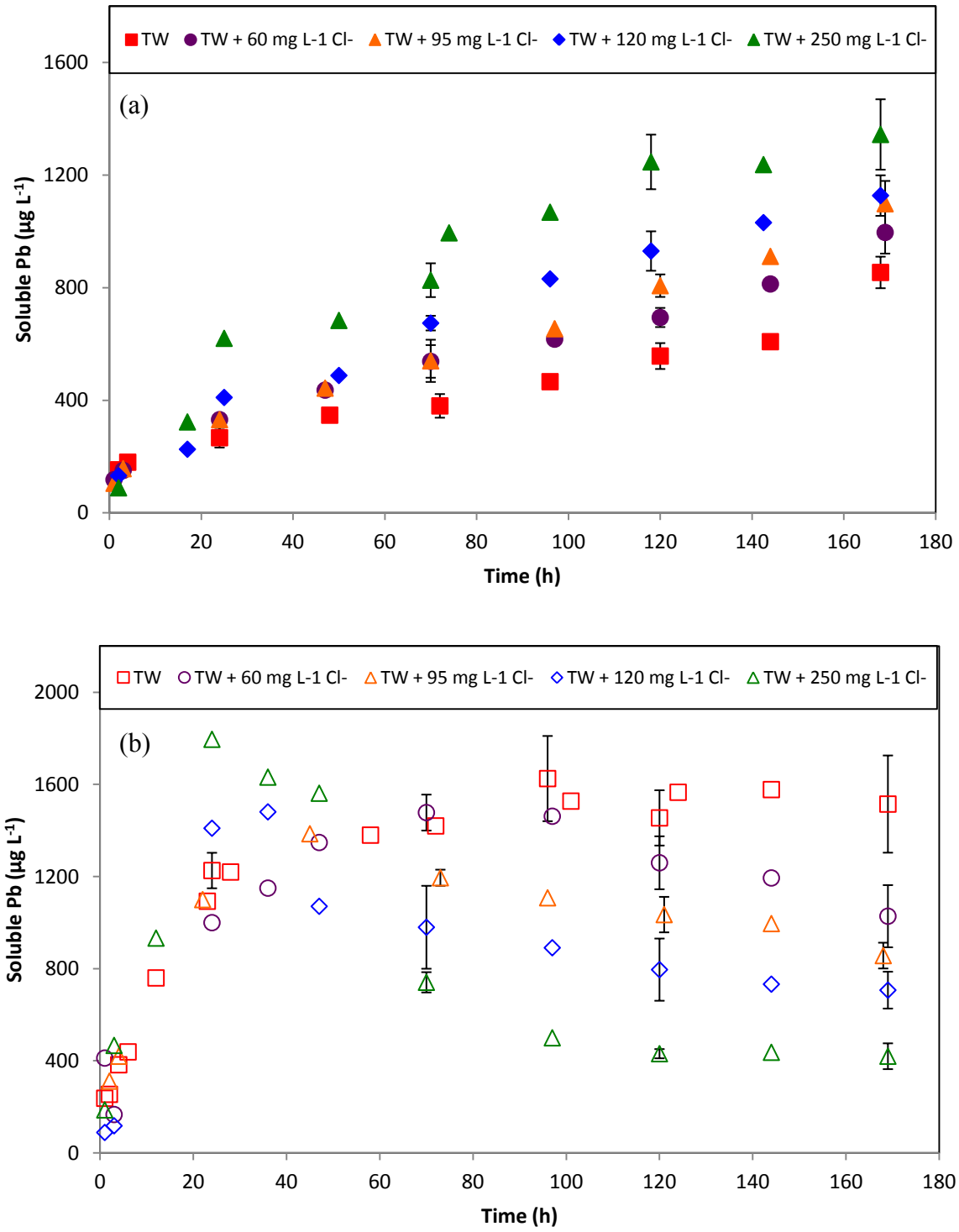


**Fig. S6.** Soluble lead under (a) stagnant and (b) completely mixed conditions as a function of time with different chloride dosages. TW, tap water (pH = 7.0, 35 mg $L^{-1}$ $Cl^-$ and 18 mg $L^{-1}$ $SO_4^{2-}$).

 

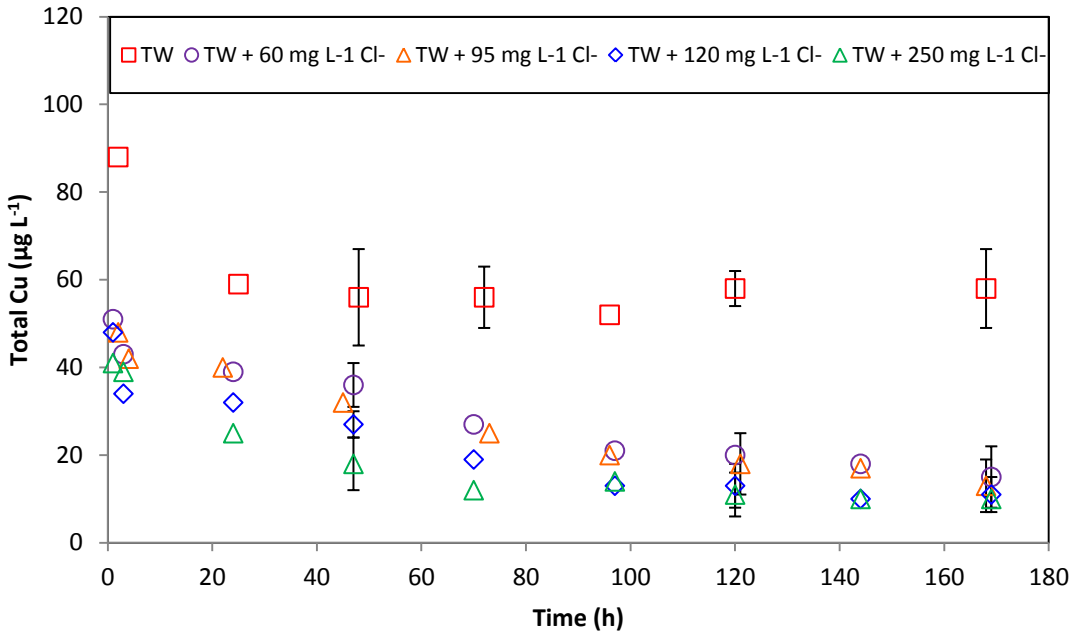


**Fig. S7.** Total copper as a function of time with different chloride dosages under completely mixed conditions. TW: tap water (pH = 7.0, 35 mg $L^{-1}$ $Cl^-$ and 18 mg $L^{-1}$ $SO_4^{2-}$).

 

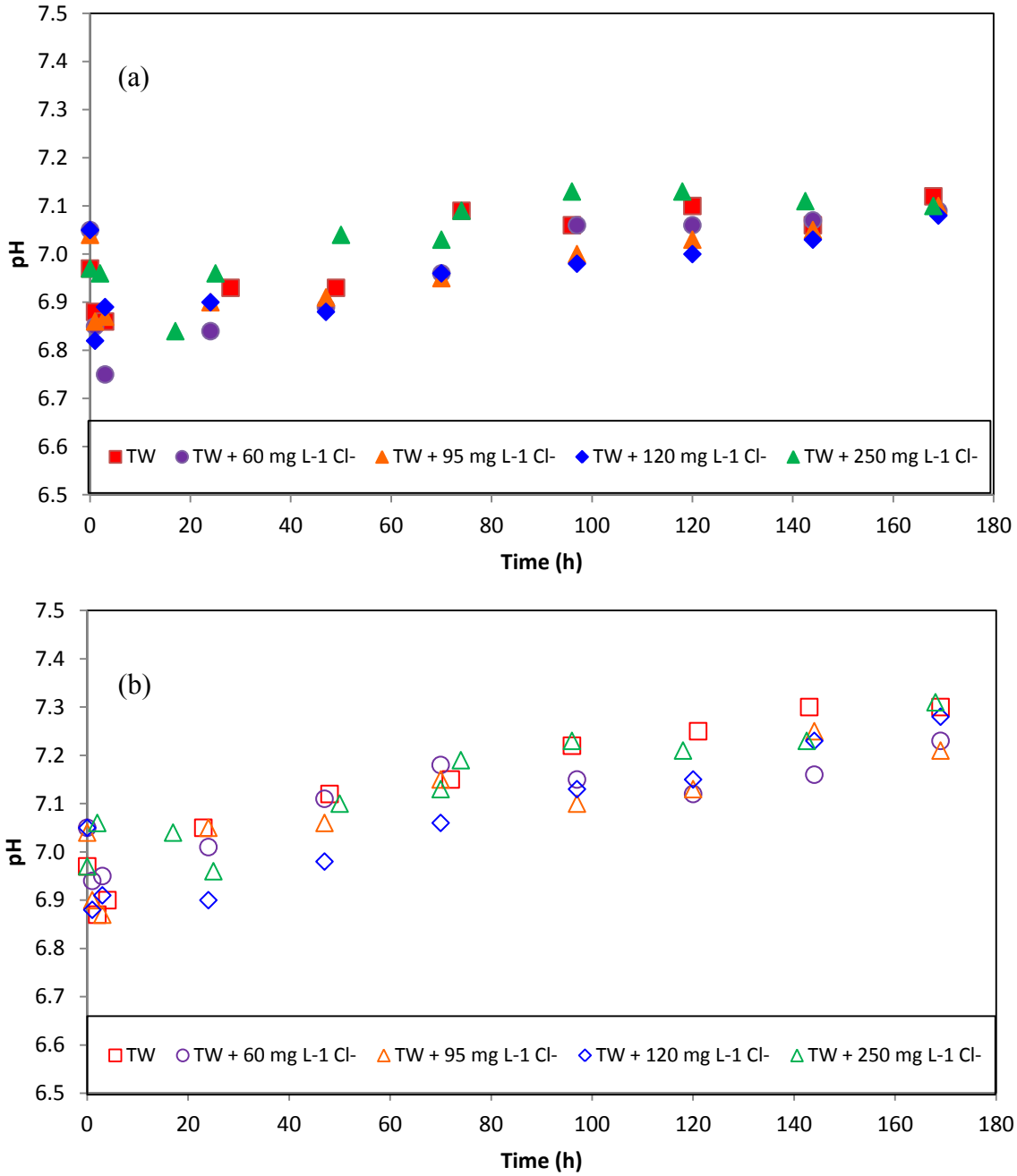


**Fig. S8.** Solution pH under (a) stagnant and (b) completely mixed conditions as a function of time with different chloride dosages. TW, tap water (pH = 7.0, 35 mg $L^{-1}$ $Cl^{-}$ and 18 mg $L^{-1}$ $SO_4^{2-}$).

 

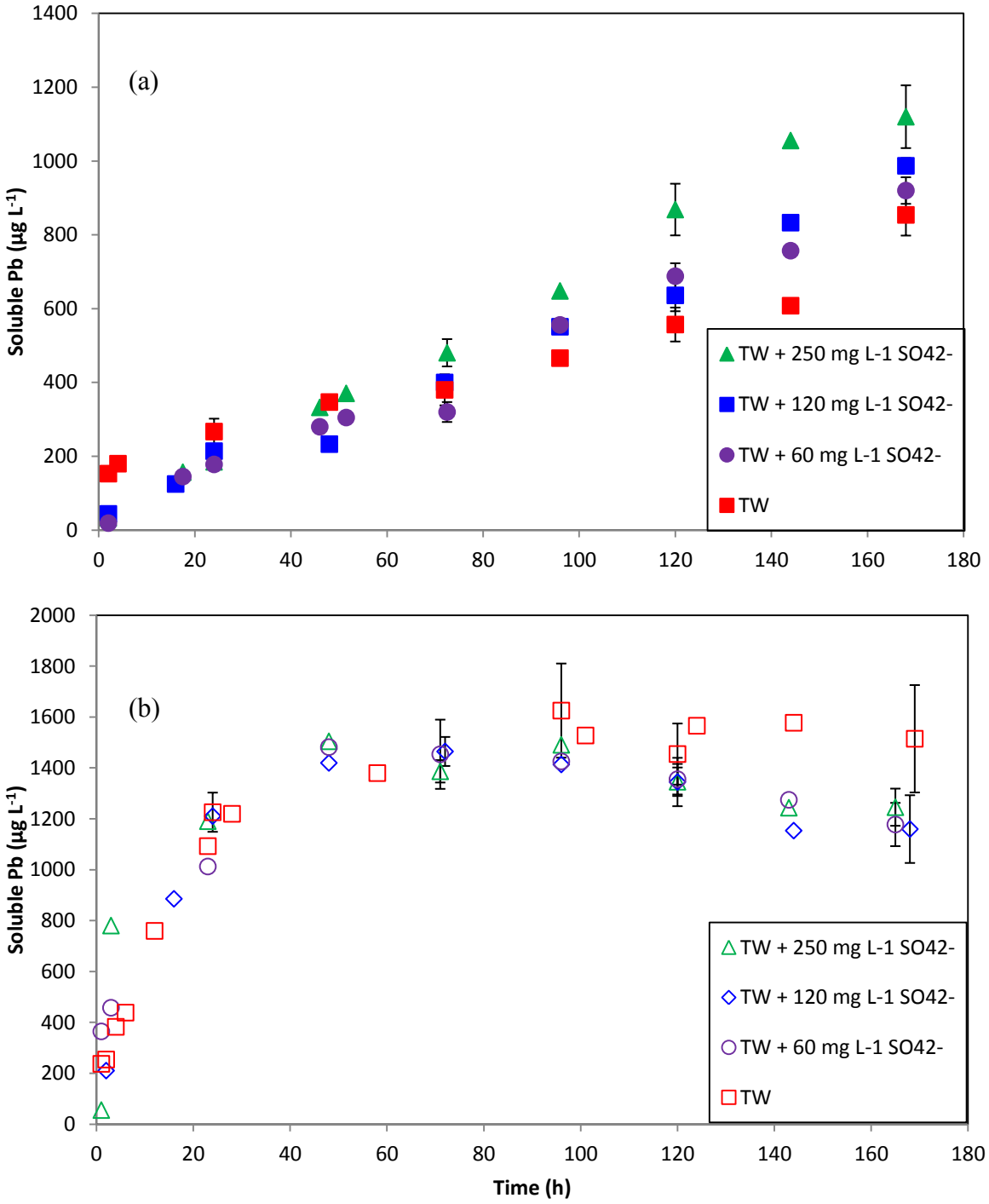


**Fig. S9.** Soluble lead under (a) stagnant and (b) completely mixed conditions as a function of time with different sulfate dosages. TW, tap water (pH = 7.0, 35 mg $L^{-1}$ $Cl^{-}$ and 18 mg $L^{-1}$ $SO_4^{2-}$).

 

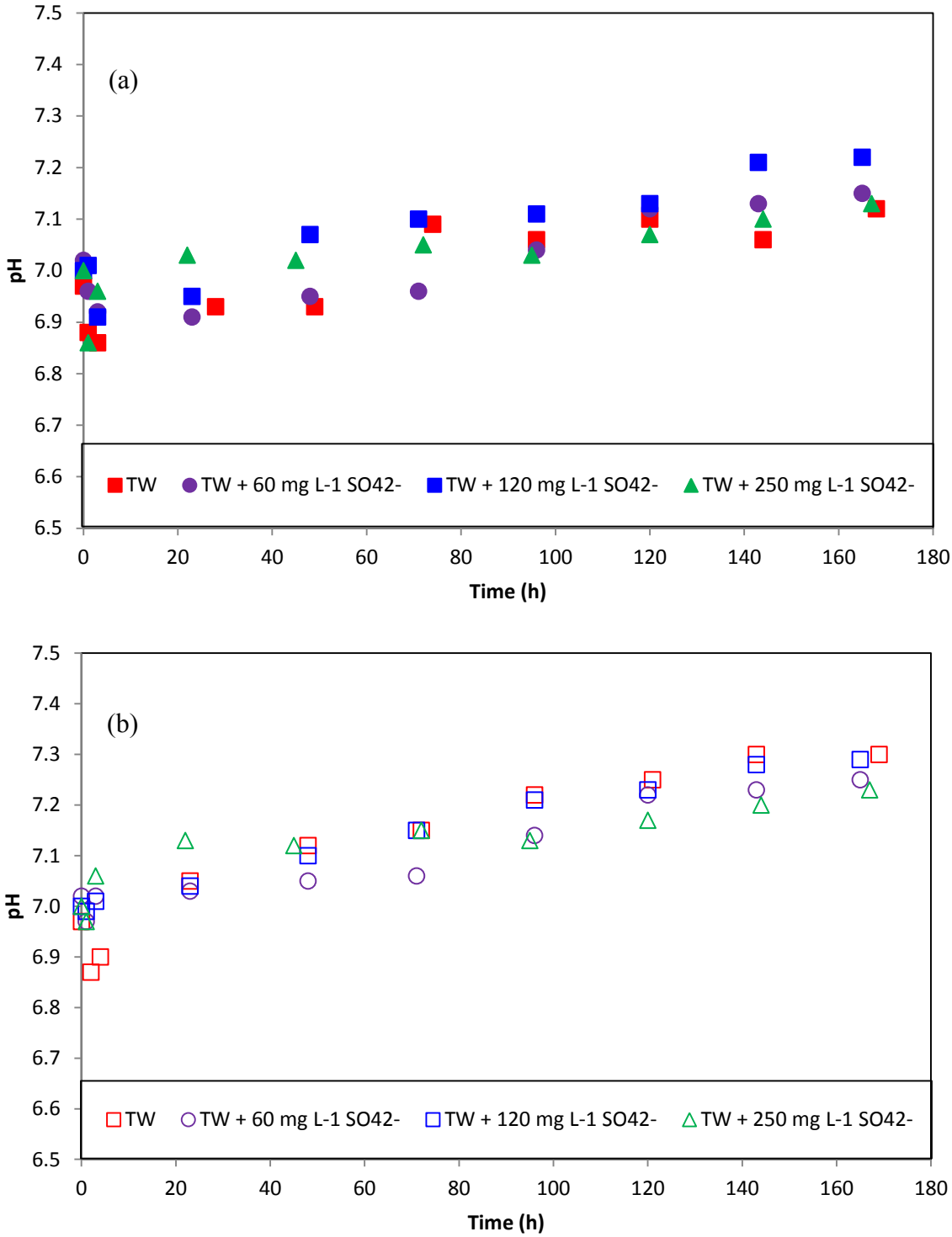


**Fig. S10.** Solution pH under (a) stagnant and (b) completely mixed conditions as a function of time with different sulfate dosages. TW, tap water (pH = 7.0, 35 mg $L^{-1}$ $Cl^-$ and 18 mg $L^{-1}$ $SO_4^{2-}$).

 

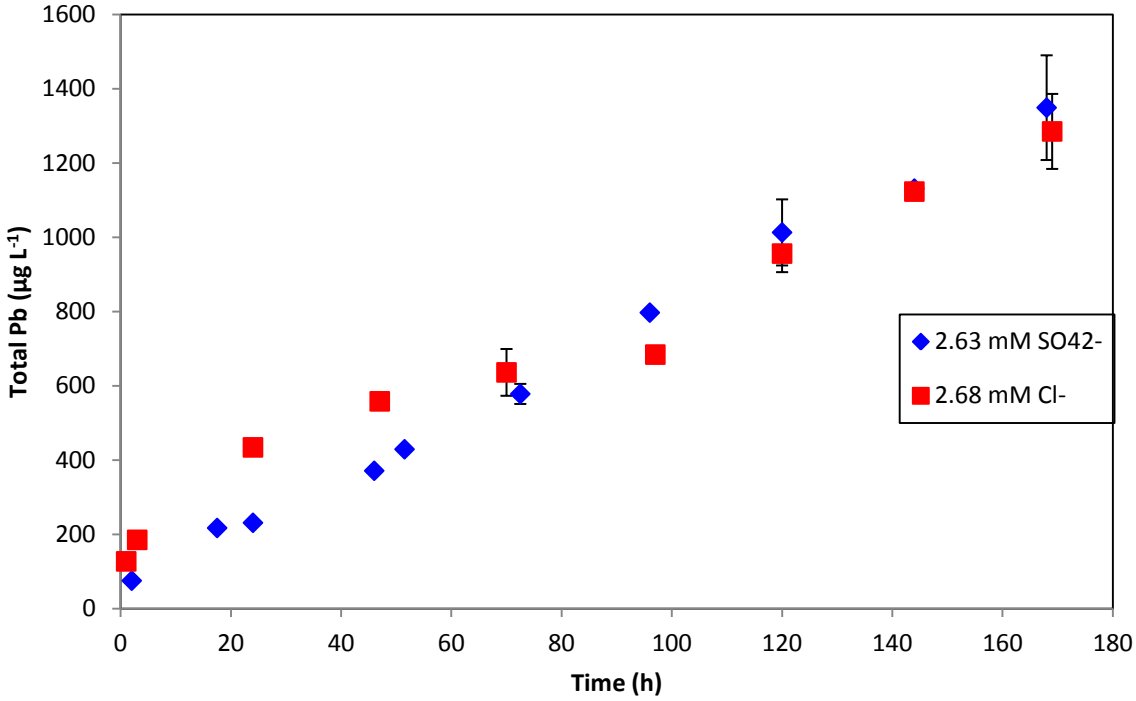


**Fig. S11.** Comparison between the effects of chloride and sulfate additions of about 2.65 mM on total lead concentration under stagnant conditions. Experimental conditions: pH = 7.0.

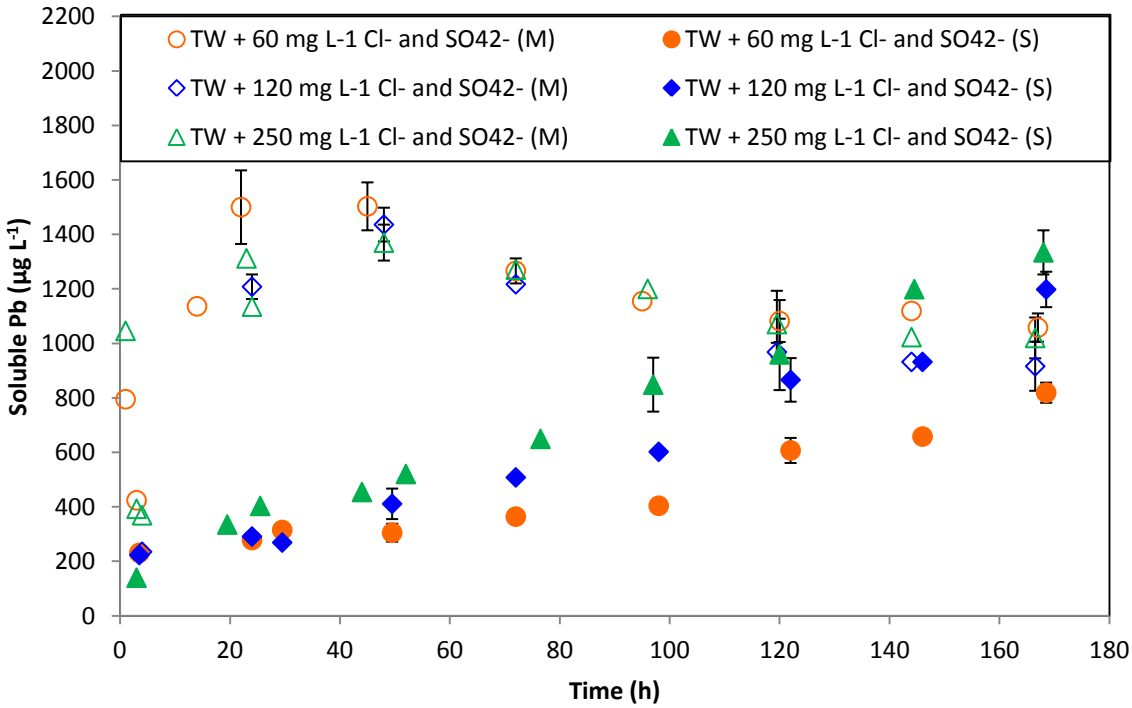


**Fig. S12.** Soluble lead as a function of time with different chloride and sulfate additions at a constant CSMR of 1 in stagnant and completely mixed conditions. TW, tap water (pH = 7.0, 35 mg $L^{-1}$ $Cl^-$ and 18 mg $L^{-1}$ $SO_4^{2-}$); S, stagnant; M, completely mixed.

 

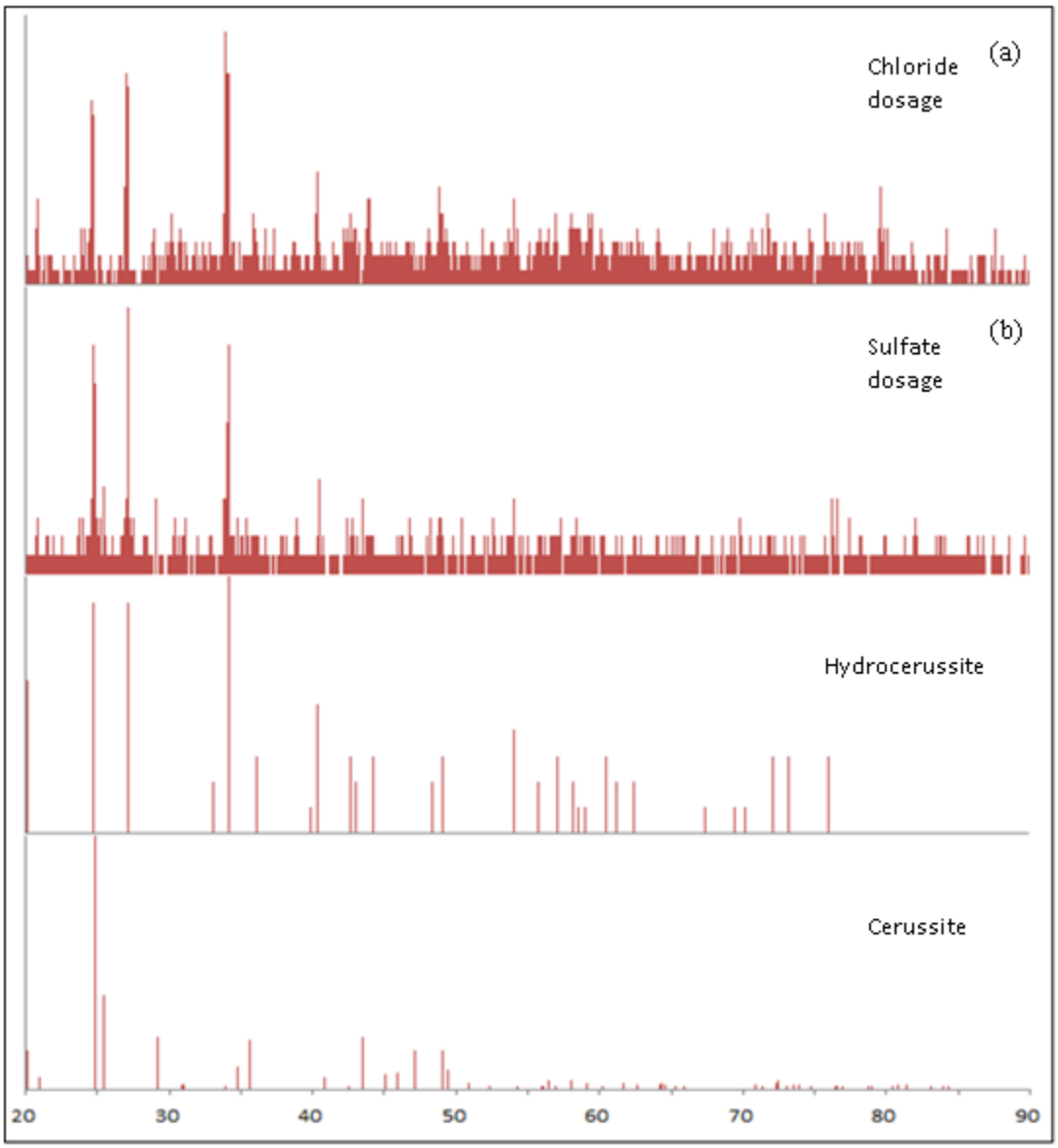


**Fig. S13.** X-Ray diffraction (XRD) patterns of scaling collected after 7 d under completely mixed conditions at pH 7.0. (a) Chloride dosage of 250 mg $L^{-1}$, (b) sulfate dosage of 250 mg $L^{-1}$. Reference standards for hydrocerussite and cerussite obtained from PDF cards: 00-013-0131 and 00-047-1734 respectively.