Supplementary Materials

Table S1. Initial concentrations of Cu, Zn, Cd and Cr in authentic copper and gold tailing leachates.

Real leachates	Metal concentrations (mg L^{-1})			
	Cu	Zn	Cd	Cr
Gold tailing	8.53±0.12	8.66±0.19	0.4±0.11	43.58±1.63
Copper tailing	140.5±2.31	138.9±2.42	6.25±0.64	1.9±0.21

Table S2. Theoretical equilibrium concentrations of different trace metals at pH of 8.5, which were calculated based on solubility product constant (K_{sp}).

metal hydroxide	K_{sp}	$[M^{n+}]$(mol L^{-1})	$C[M^{n+}]$(mg L^{-1})
$Cu(OH)_2$	2.2×10^{-20}	2.2×10^{-9}	1.40×10^{-4}
$Cd(OH)_2$	2.5×10^{-14}	2.5×10^{-3}	281
$Zn(OH)_2$	1.2×10^{-17}	1.2×10^{-6}	78.5×10^{-2}
$Cr(OH)_3$	6.3×10^{-31}	2.0×10^{-14}	1.04×10^{-9}

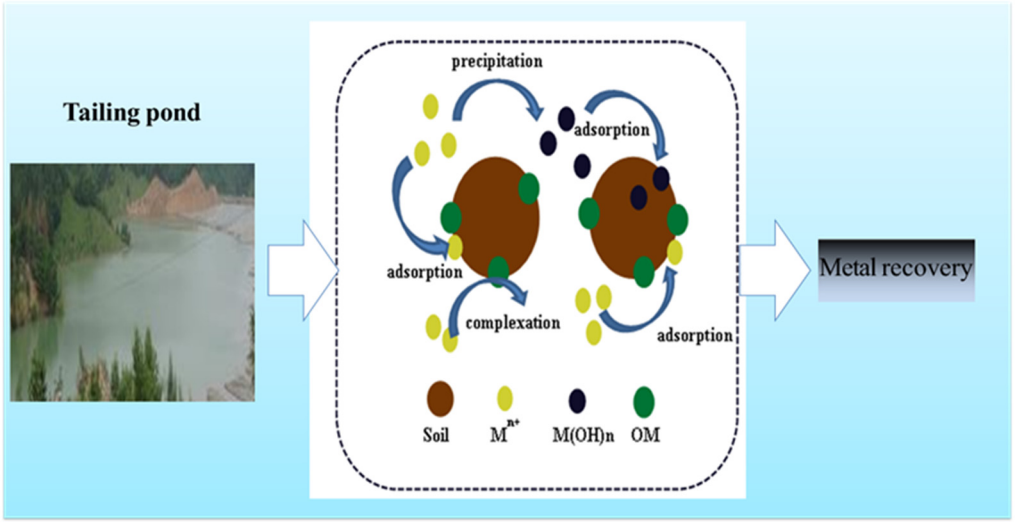

Figure S1. The flow chart of the alkali suspension method.

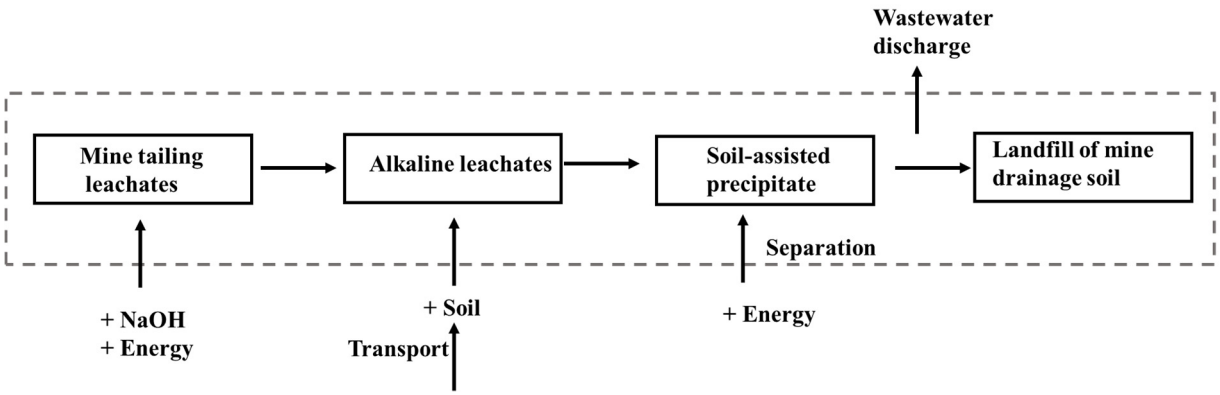

Figure S2. General system boundaries for tailing leachates treatment though alkali suspension method.

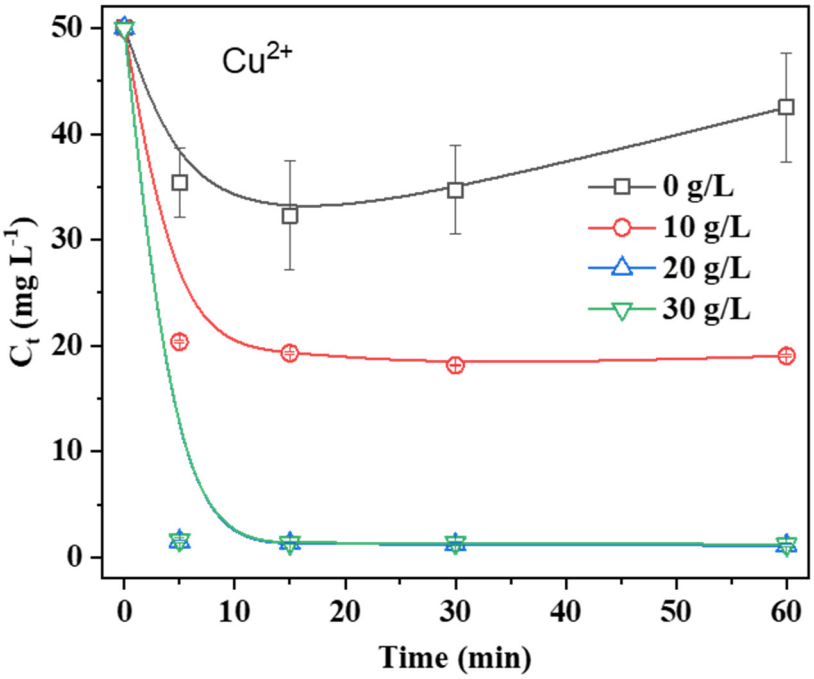

Figure S3. Effect of different soil concentrations on the Cu^{2+} during the reaction.

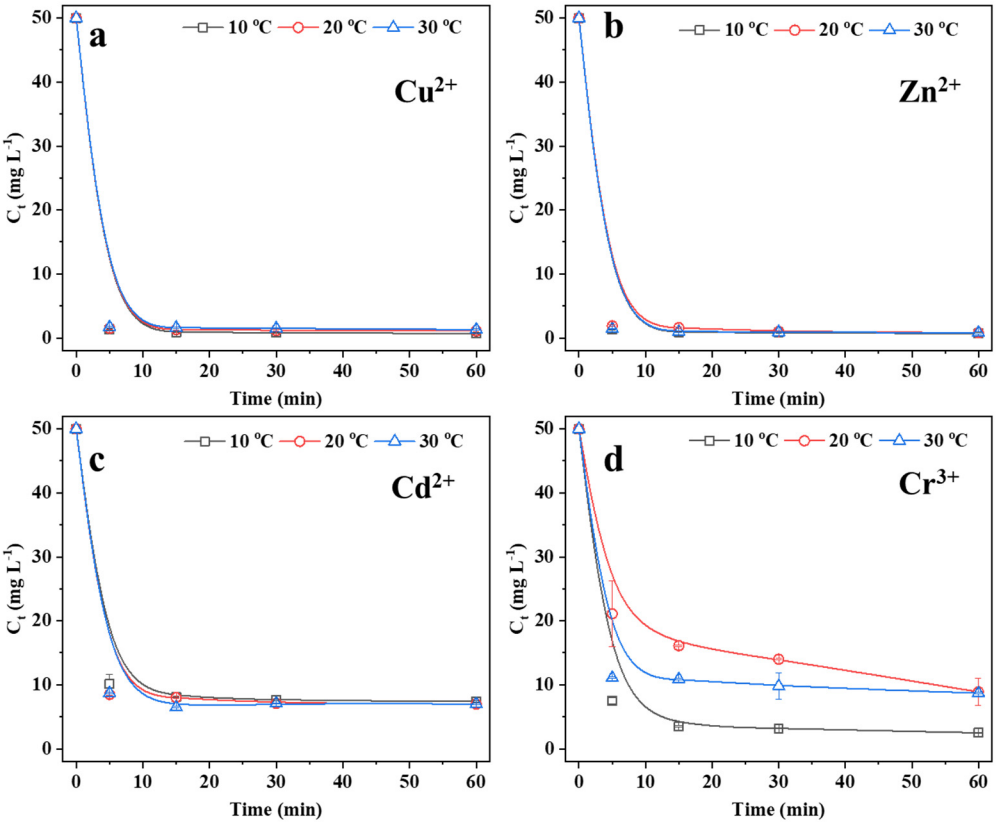

Figure S4. Concentration-time curves of (a) Cu, (b) Zn, (c) Cd and (d) Cr at 10, 20 and 30 °C.

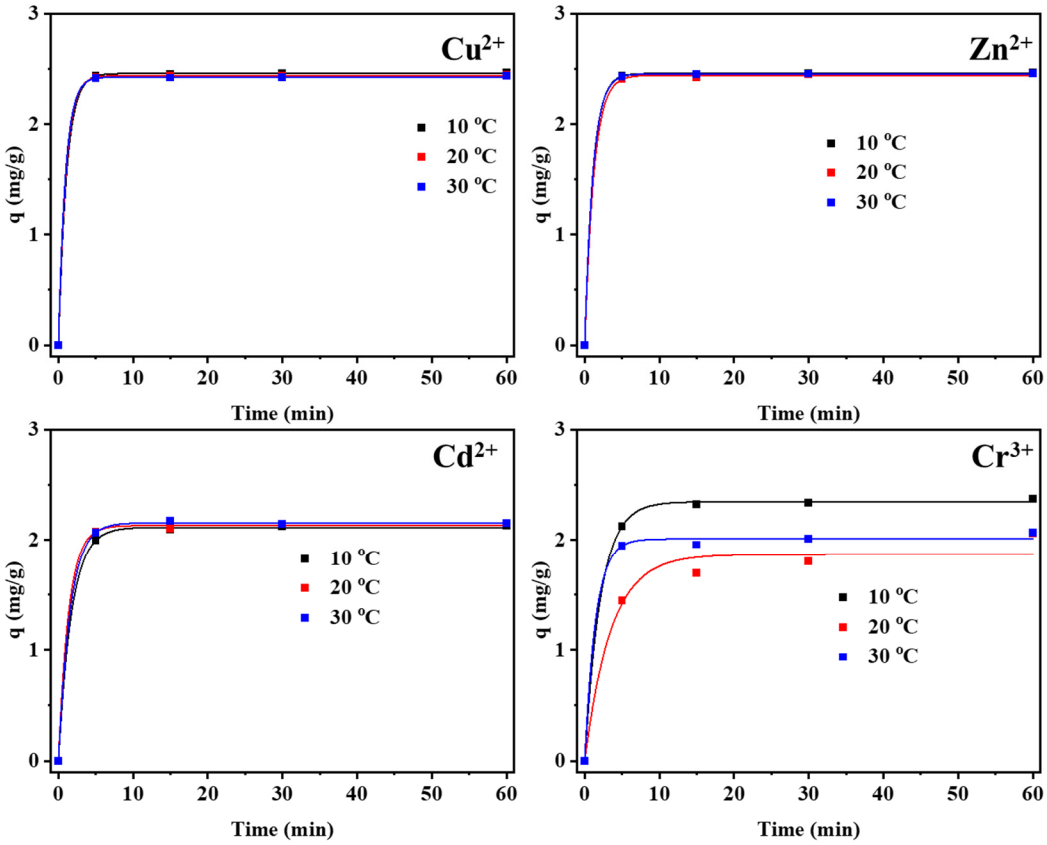

Figure S5. The pseudo-first-order kinetics model of trace metal removal in the alkali-soil system.

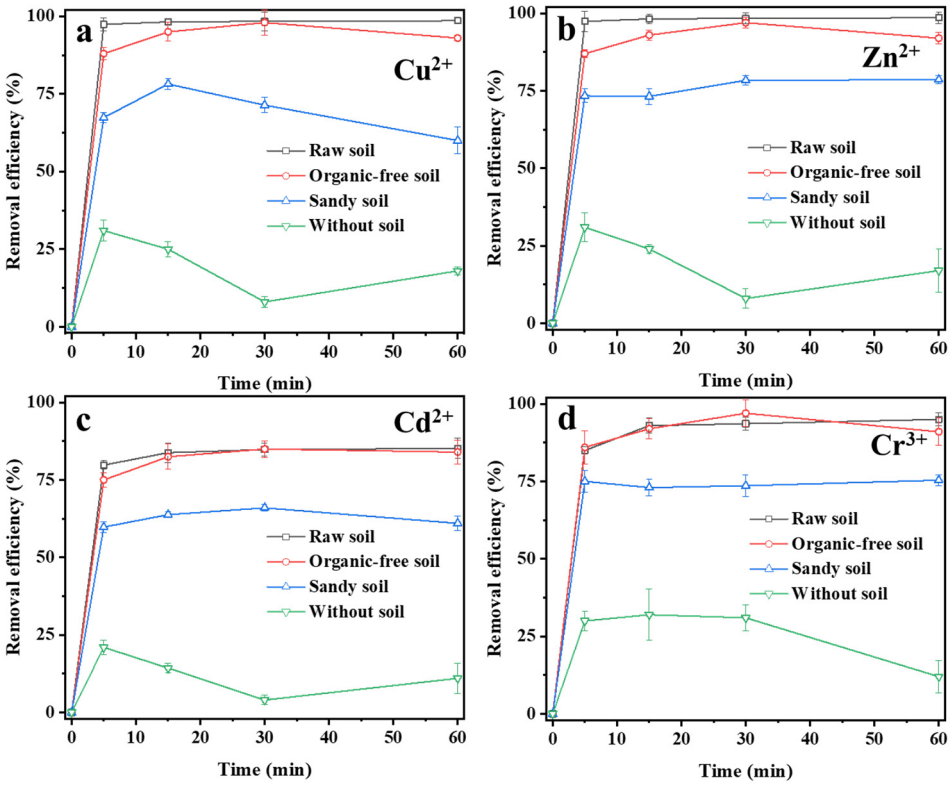

Figure S6. Removal efficiencies of trace metals in solutions treated with raw soil, organic-free soil, sandy soil, and without soil. The pH of the synthetic leachate was adjusted to 8.5.