Supplementary Material: Effect of Long-Term Stockpiling on O idation and Flotation Response of Low-Grade Copper Sulphide Ore

Aline Cristina Tavares, Marisa Bezerra de Mello Monte and Luís Marcelo Tavares *

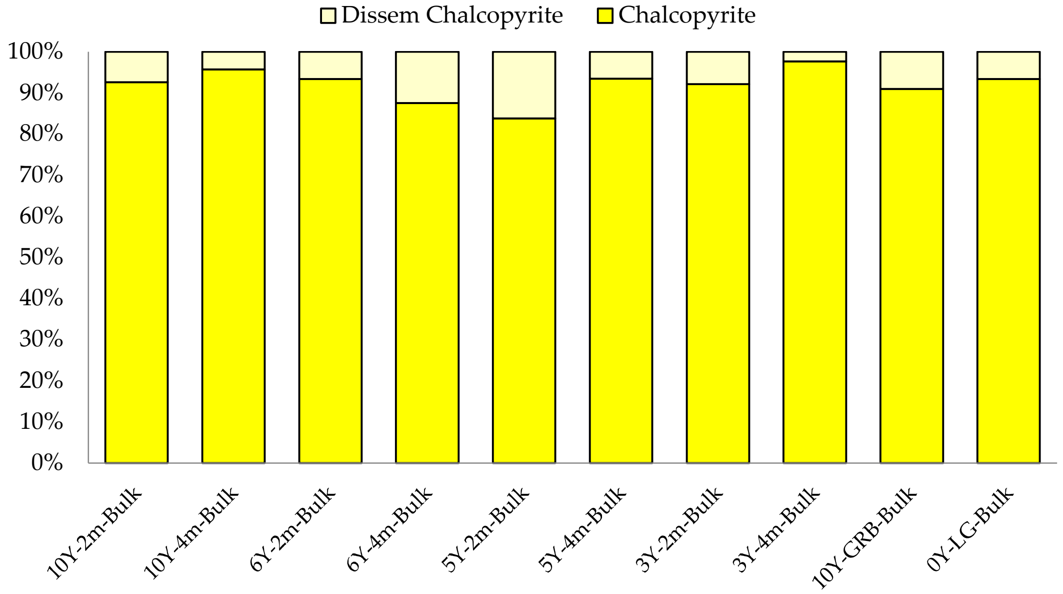

Figure S1. Copper deportment (wt.%) of the bulk samples.

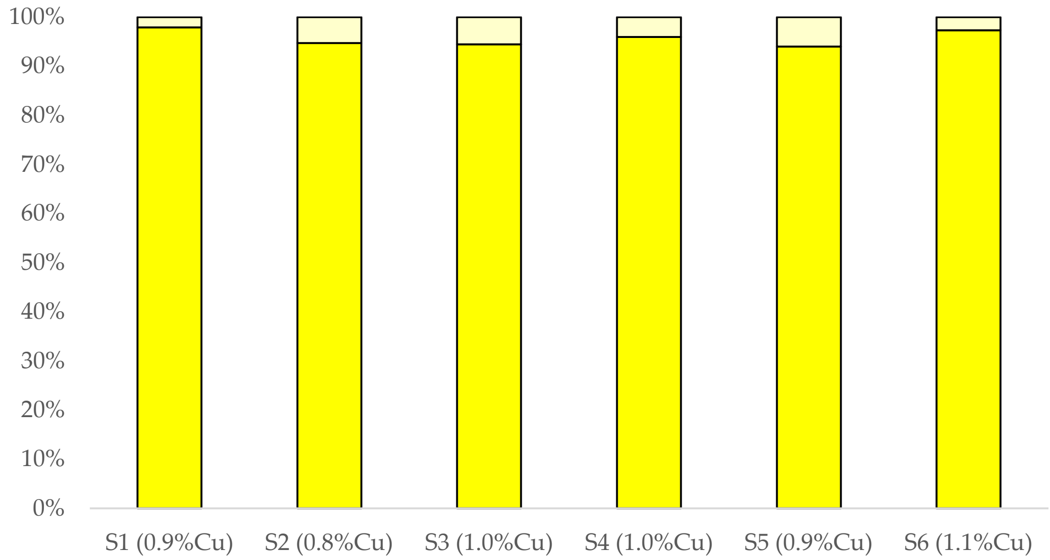

Figure S2. Copper deportment (wt.%) of six flotation feed samples.

Table S1. Chemical formulas of minerals cited identified in the copper ore.

Mineral	Acronym	Formula
Amphiboles	apl	Inosilicate minerals, forming prism or needlelike crystals, composed of double chain SiO_4 tetrahedra, linked at the vertices and generally containing iron and/or magnesium in their structures
Apatite	ap	$Ca_{10}(PO_4)_6(OH,F,Cl)_2$
Biotite	bt	$K(Mg,Fe)_3AlSi_3O_{10}(F,OH)_2$
Carbonates	cb	Minerals containing the carbonate ion, CO_2^{-3}
Chalcocite	cc	Cu_2S
Chalcopyrite	ccp	$CuFeS_2$
Chlorite	chl	$(Mg,Fe)_3(Si,Al)_4O_{10}(OH)_2{\cdot}(Mg,Fe)_3(OH)_6$
Epidote	ep	$Ca_2Al_2(Fe^{3+};Al)(SiO_4)(Si_2O_7)O(OH)$
Fluorite	flr	CaF_2
Feldspar	fsp	Aluminosilicate minerals with general formula XY_4O_8 in which X = potassium, sodium, or calcium (Ca); and Y = silicon (Si) and aluminum (Al), with a Si:Al ratio ranging from 3:1 to 1:1
Garnet	grn	Nesosilicates with general formula $X_3Y_2(SiO_4)_3$ in which X = divalent cations (Ca, Mg, Fe, Mn) and Y = trivalent cations (Al, Fe, Cr) in an octahedral/tetrahedral framework with $[SiO_4]^{4-}$ occupying the tetrahedra
Magnetite	mg	Fe_3O_4
Pyrite	py	FeS_2
Quartz	qz	SiO_2
Scapolite	sc	Silicates composed of aluminium, calcium, and sodium silicate with chlorine, carbonate and sulfate

Table S2. First regression model found to estimate copper recovery in the rougher stage.

Equation Number	Size Fraction (mm)	Equation	
(1)	150 × 100	Cu Recovery (%) =	88.07 + 8.00×Cu (%)
(2)	100 × 76.2	Cu Recovery (%) =	88.13 + 8.00×Cu (%)
(3)	76.2 × 50	Cu Recovery (%) =	89.21 + 8.00×Cu (%)
(4)	50 × 25	Cu Recovery (%) =	89.44 + 8.00×Cu (%)
(5)	25 × 12.5	Cu Recovery (%) =	87.82 + 8.00×Cu (%)
(6)	12.5 × 6.3	Cu Recovery (%) =	87.74 + 8.00×Cu (%)
(7)	6.3 × 3.35	Cu Recovery (%) =	82.54 + 8.00×Cu (%)
(8)	3.35 × 1	Cu Recovery (%) =	77.48 + 8.00× Cu (%)
(9)	1 × 0	Cu Recovery (%) =	47.43 + 8.00× Cu (%)

Table S3. Run of mine particle size distribution to estimate Cu recovery in the rougher stage.

Size (mm)	Cumulative Passing (wt.%)	Retained (wt.%)	Cu Grade (wt.%)	Cu Recovery (wt.%) Predicted
1910	100.00	0.00	0.34	91.2
1270	99.22	0.78	0.34	91.2
640	86.57	12.65	0.34	91.2
380	65.34	21.23	0.34	91.2
250	47.77	17.57	0.34	91.2
200	39.99	7.78	0.34	91.2
150	31.85	8.14	0.34	91.2
100	23.02	8.83	0.34	91.2
50	13.27	9.75	0.34	91.2
25	7.68	5.59	0.34	91.2
20	6.13	1.55	0.34	91.2
10	4.46	1.67	0.34	91.2
8	3.56	0.90	0.34	91.2
6	2.60	0.96	0.34	91.2
4	2.08	0.52	0.34	84.8
2	1.07	1.01	0.34	84.8
<2		1.07	0.34	50.1
TOTAL		**100.00**	**0.34**	**90.7**