

Combined Bacterial and Pressure Oxidation for Processing High-Sulfur Refractory Gold Concentrate

Anna Boduen ¹, Maxim Zalesov ^{1,2}, Vitaliy Melamud ³, Victoria Grigorieva ¹ and Aleksandr Bulaev ^{3,*}

¹ RIVS Group of Companies, 199155 Saint Petersburg, Russia; a_boduen@riva.ru (A.B.); m_zalesov@riva.ru (M.Z.); viktoriaa.grigoreva98@mail.ru (V.G.)

² Faculty of Mineral Raw Material Processing, Saint-Petersburg Mining University, 21st Line 2, 199106 Saint Petersburg, Russia

³ Research Center of Biotechnology, Russian Academy of Sciences, 119071 Moscow, Russia; vmelamud.inmi@yandex.ru

* Correspondence: bulaev.inmi@yandex.ru; Tel.: +7-499-135-04-21

Table S1. Main element content in the concentrate and STRB and POX residues (mass %)

Product	Fe _{total}	A _{total}	S _{total}	S _{sulfate}	S ⁰	S _s
Concentrate	24.4	11.1	21.4	0.1	0.0	21.3
STRB residue	20.2	4.3	19.2	1.4	1.4	16.4
2 days	13.2	3.8	14.1	4.0	1.5	8.6
4 days	10.1	6.3	14.1	6.5	1.5	6.2
6 days	20.0	4.0	32.0	31.0	0.0	0.1<
POX of initial concentrate	15.2	5.9	3.9	2.9	0	1.0
POX of 2 day bio-oxidation residue	12.0	4.4	4.6	4.0	0	0.6
POX of 4 day bio-oxidation residue	9.7	3.7	7.0	6.8	0.2	16.4

Table S2. Share of different size fractions of the concentrate (mass %) analyzed using VP50 sieve analyzer (Vibrotechnik, Saint-Petersburg, Russia) and gold content in size fraction (share of the total gold, %)

Fraction, μm	Content, mass %	Share of the total gold, %
+ 100	27.9	10.8
- 100 + 71	6.3	6.2
- 71 + 45	14.6	22.0
- 45 + 20	17.4	29.6
- 20 + 0	33.7	28.1

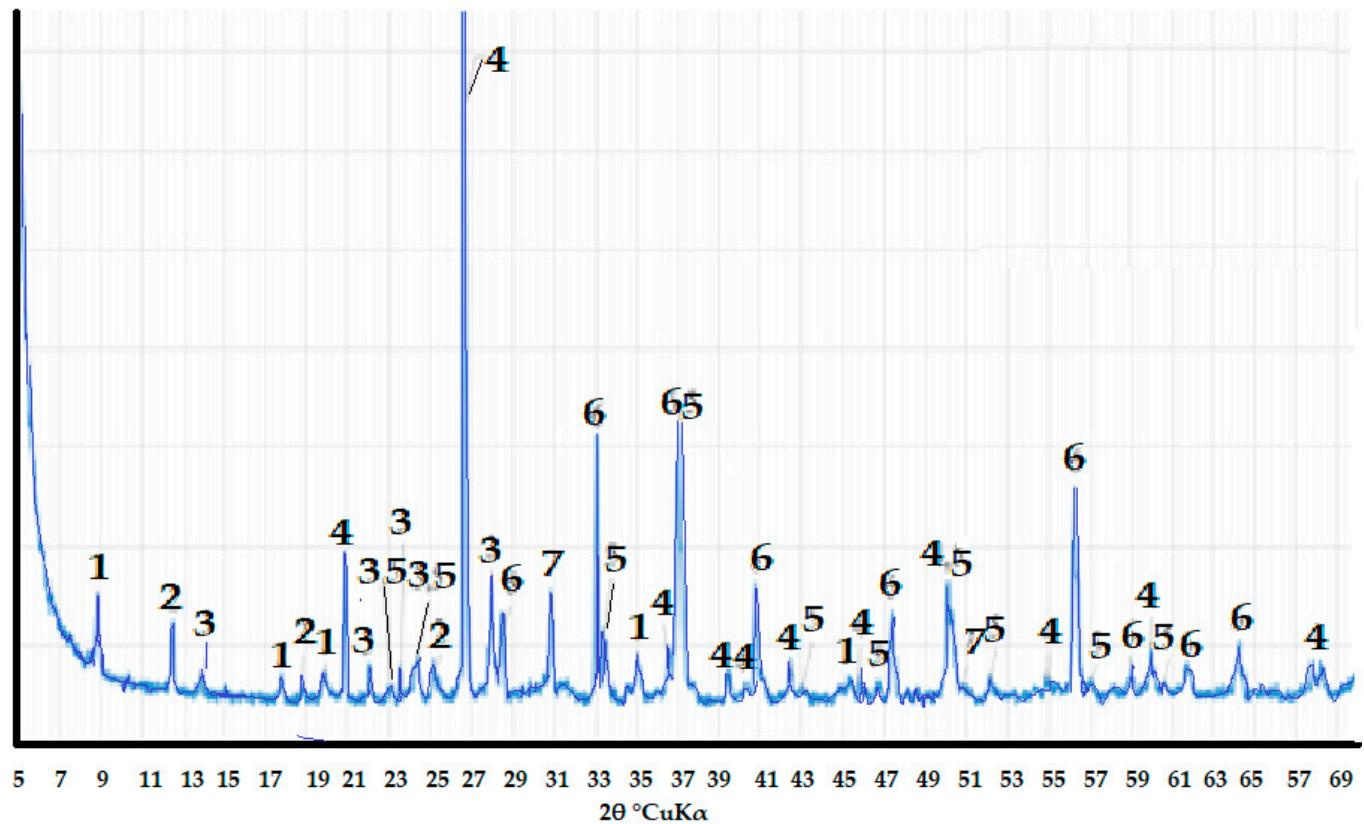


Figure S1. X-ray diffraction pattern of the concentrate (XRD analysis was performed using D2 PHASER ($\text{CuK}\alpha$) diffractometer (Bruker, Billerica, USA). 1 – mica; 2 – chlorite; 3 – feldspar; 4 – quartz; 5 – arsenopyrite; 6 – pyrite; 7 – dolomite.