AGQ Mining & Bioenergy

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CLIENT: CORCEL MINERALS, S.L, a company owned by EUROBATTERY MINERALS AB

PRELIMINARY METALLURGICAL TESTING FOR NICKEL RECOVERY

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1. RECEPTION OF INITIAL SAMPLE AND PREPARATION

On 30 August 2022, 3 bags of minerals were received at the premises of AGQ containing the samples COR22MIN001 (6.11 kg), COR22MIN002 (7.45 kg), and COR22MIN003 (6.19 kg). These were rejected samples from drilling different Ni and Cu ore grades, sent by the client CORCEL MINERALS S.L.

The scope of the study included performing a grinding curve for each of the materials received, which were under 2 mm. After performing the original granulometry of the first sample (COR22MIN0001), it was observed that this material was not suitable for use in the grinding curve given the dimensions of the grinding jar and the predefined ball load. Therefore, the size was reduced using a Nordberg MK25 cone crusher.

Following the sample homogenisation process and conservation of the samples, an aliquot was taken from each of the samples for chemical testing and determination of their metal content by means of ICP-OES following aqua regia digestion, as well as the sulphur speciation to quantify the sulphur level in the sample.

2. ANALYTICAL STUDY

2.1) Metals analysis through aqua regia digestion and determination in ICP-OES.

Head grade analyses were performed on the homogenised samples to determine the nickel grade and other elements present in the samples. The chosen analytical method was based on disaggregating the sample by using concentrated acids (aqua regia digestion) and temperature to subsequently measure the resulting dissolution of metal contents by means of ICP-OES spectrometry (Agilent 5110 with axial/radial vision). The results of these analyses follow:

Cod. SIL	Cod. Sample	Al (mg/kg)	Sb (mg/kg)	As (mg/kg)	S (mg/kg)	Ba (mg/kg)	Be (mg/kg)	Bi (mg/kg)	B (mg/kg)	Cd (mg/kg)
MN-22/011583	CORMIN001	12528.32	< 10	< 10	6989.15	< 5	< 5	< 10	111.54	< 5
MN-22/011584	CORMIN002	10520.29	< 10	< 10	2382.12	< 5	< 5	< 10	113.66	< 5
MN-22/011585	CORMIN003	9407.01	< 10	< 10	11660.29	< 5	< 5	< 10	16.90	< 5

Cod. SIL	Cod. Sample	Ca (mg/kg)	Co (mg/kg)	Cu (mg/kg)	Cr (mg/kg)	Sc (mg/kg)	Sn (mg/kg)	Sr (mg/kg)	P (mg/kg)	Ga (mg/kg)
MN-22/011583	CORMIN001	3530.14	138.51	902.96	1039.83	8.93	< 10	< 5	< 200	15.17
MN-22/011584	CORMIN002	12456.70	95.34	224.50	1802.74	6.20	< 10	18.60	< 200	11.46
MN-22/011585	CORMIN003	6875.14	140.02	1610.76	1985.23	7.44	< 10	10.33	< 200	10.43

Cod. SIL	Cod. Sample	Fe (mg/kg)	In (mg/kg)	Li (mg/kg)	Mg (mg/kg)	Mn (mg/kg)	Hg (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Ag (mg/kg)
MN-22/011583	CORMIN001	88294.49	35.23	5.86	130895.66	918.60	< 10	< 10	3422.35	< 5
MN-22/011584	CORMIN002	58865.11	17.38	< 5	119988.54	745.91	< 10	< 10	2240.28	< 5
MN-22/011585	CORMIN003	55362.88	16.99	< 5	90451.91	579.18	< 10	< 10	5753.96	< 5

Cod. SIL	Cod. Sample	Pb (mg/kg)	K (mg/kg)	Se (mg/kg)	Na (mg/kg)	Tl (mg/kg)	Ti (mg/kg)	V (mg/kg)	W (mg/kg)	Zn (mg/kg)
MN-22/011583	CORMIN001	10.27	< 500	< 10	< 500	< 5	404.20	53.18	10.08	< 100
MN-22/011584	CORMIN002	11.08	< 500	< 10	< 500	< 5	341.72	47.53	6.95	< 100
MN-22/011585	CORMIN003	8.30	< 500	< 10	< 500	< 5	286.21	56.88	6.76	< 100

We observed that one of the higher concentration metals is Ni, though there are also high concentrations of aluminium, iron, and magnesium.

There is a relationship between the amount of nickel and the amount of sulphur in the various analysed samples.

2.2) Sulphur speciation.

In addition to quantifying the total amount of sulphur in the samples, it is also important to understand the form in which the sulphur is found, because this can provide us with clues as to the mineral species present and their behaviour during concentration testing.

The different sulphur species are determined using the LECO CS744 element analyser, with some pre-treatment of the sample intended to selectively eliminate some of the types of sulphur in the sample.

In the flotation tests in particular, the two most important sulphur species are sulphates and sulphides. The former are the most common types in the earth's crust, and the latter (S^{2-}) are the form that tend to appear in metal minerals, in particular those which are likely to be concentrated using froth flotation techniques. To determine S in the form of sulphates, the sample was subjected to pyrolysis at 550ºC to accelerate combustion of the sulphides in the sample, and then the sulphate quantity was determined in the LECO element analyser. The quantity of sulphides is given by the difference between the total S and S-SO4.

The results are as follows:

Cod. Laboratory	Sample	S_T	S (SO_4, %)	S (S^{2-}, %)
MN-22/011583	Sample CORCEL 01	0.65	0.48	0.17
MN-22/011584	Sample CORCEL 02	0.25	0.25	0.00
MN-22/011585	Sample CORCEL 03	1.10	0.74	0.37

2.3) Granulometric description of the head sample.

The granulometry study of the sample was carried out by wet sieving. As indicated in point 1, the samples were pre-treated using secondary cone grinding, since over 20% of the original sample had a size greater than 2 mm.

The results of the granulometry distributions obtained are the following:

CORMIN001

Sieve (mm)	mass (g)	% Retained	% Accumulated
2	10.75	1.78	98.22
1	142.05	23.48	74.75
0.5	122.25	20.20	54.54
0.25	83.75	13.84	40.70
0.125	62.75	10.37	30.33
0.075	48.05	7.94	22.39
<0.075	135.45	22.39	0.00

CORMIN002

Sieve (mm)	mass (g)	% Retained	% Accumulated
2	11.2	1.81	98.19
1	123.2	19.92	78.27
0.5	118.4	19.14	59.13
0.25	93.75	15.16	43.97
0.125	74.2	12.00	31.97
0.075	61	9.86	22.11
<0.075	136.75	22.11	0.00

CORMIN003

Sieve (mm)	mass (g)	% Retained	% Accumulated
2	11.55	1.91	98.23
1	128.6	21.25	78.55
0.5	125.4	20.73	59.36
0.25	100.75	16.65	43.94
0.125	81.95	13.54	31.40
0.075	63.1	10.43	21.75
<0.075	142.1	23.49	0.00

The p80 of the three samples was calculated as a reference for the initial state of the sample. This gave the following results:

Cod. Sample	P80 (mm)
CORMIN01	1.22
CORMIN02	1.09
CORMIN03	1.07

3. METALLURGY WORK

3.1) Grinding curves.

When performing the metallurgy tests and, in particular, the flotation tests, particle size is especially important to guarantee partially or fully releasing the material of interest from the particles that carry it. Therefore, one of the parameters defined during the tests is the particle size, defined by the P80. The planned tests include performing flotations in two different P80s for each material to study the behaviour of the material as a function of this parameter. Therefore, given the size distribution curves of the original samples, the material needs to be ground. To obtain the required grinding times, a series of grinds were carried out lasting 15, 30, and 60 minutes. Thus, representing the P80 of each of the samples in relation to the time, we can estimate it under the same ball load, grind size, material load, and pup density conditions during grinding.

These conditions are listed below:

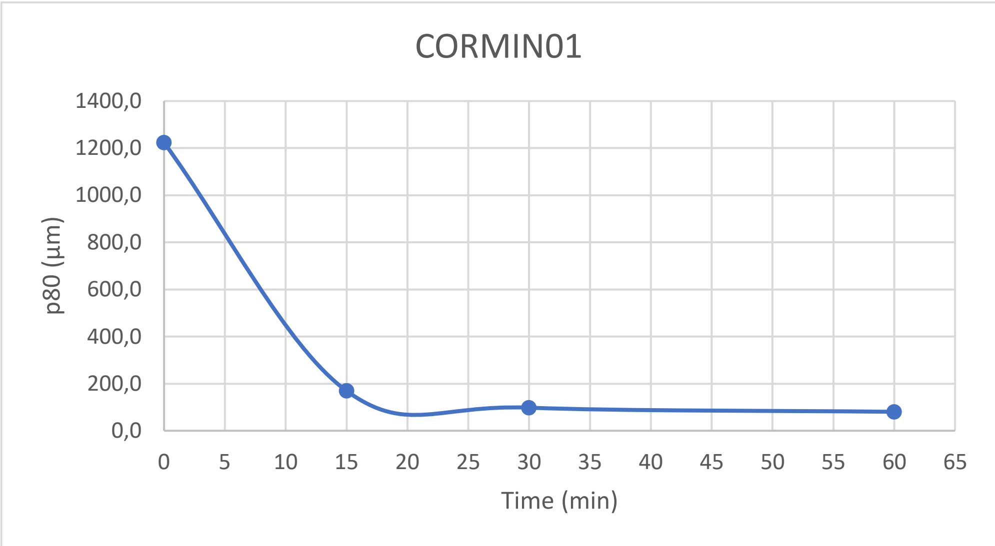
- Mill used: Orto Alresa
- Grinding jar: Stainless steel, 5L
- Ball load: 3200 g
- Pulp density: 60%
- Mineral quantity: 1000 g

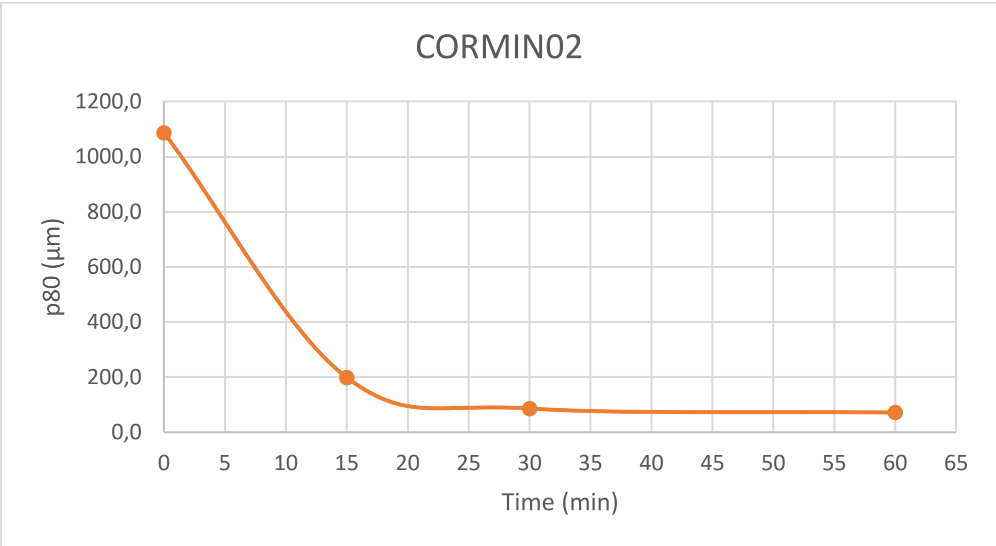
To measure the granulometry obtained for each of the grinding times used, a Beckman-Coulter LS13320 simple beam laser diffraction particle size analyser was used. The granulometry curves and particle size data is shown below:

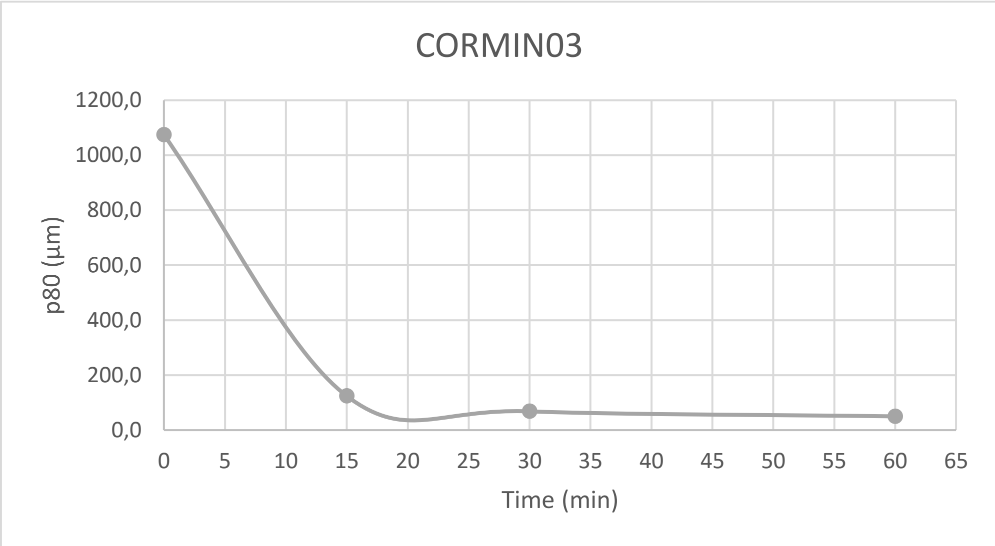
Representation of the p80 (µm) according to the sample and grinding time:

Grinding time (min)	CORMIN01	CORMIN02	CORMIN03
0	1223,8	1086,9	1073,6
15	169,5	198,5	124,0
30	98,2	85,9	68,2
60	80,6	71,4	50,1

Representing this data, we get the following granulometry curves:







3.2) Kinetic flotation tests.

There are multiple variables that influence the particle flotation process, but the most important are particle size and reactants used (dose and type). To a lesser extent, parameters that can influence the behaviour of the froth and the process yield include pH, degree of agitation, use of depressors/activators, and others.

Given that the scope planned for this stage of the project had the aim of verifying the yield of the flotations, we opted to set those variables at typical values used for nickel and copper sulphide flotations and study particle size as the variable. Particle size is a relevant factor, since it is necessary to achieve a degree of liberation of species of interest that allows them to interact with the flotation collectors.

Thus, flotation tests were carried out for each material, using the 30-minute and 60-minute times used in the grinding curve, such that the size of the material particle size is known and based on this, the release size of the species of interest can be estimated.

For the other conditions, the following values were sued as typical values in nickel and copper flotation processes:

- Pulp density: 30% w/w
- Activator: CuSO4 (250 g/T)
- Collectors: Mix of dithiophosphates (100 g/T) and potassium amylxanthate (100 g/T)
- Agitation: 900 r.p.m

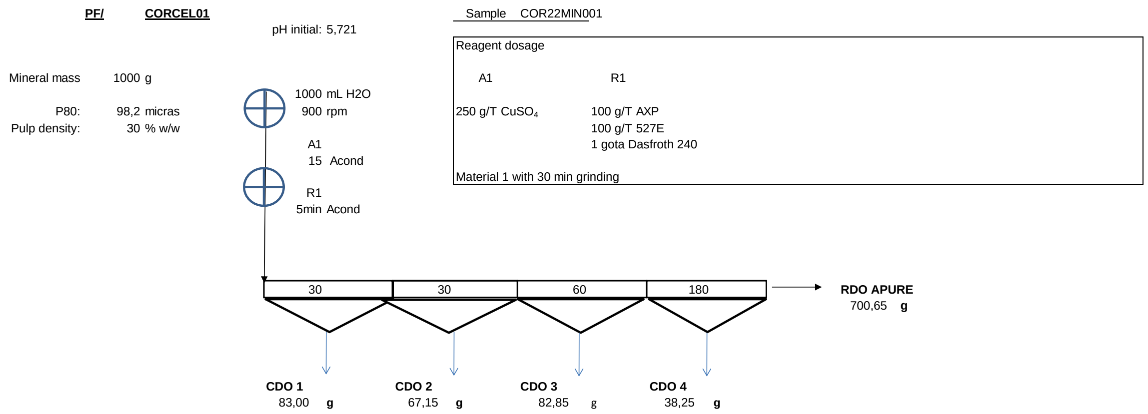
- pH: natural, no adjustment.
- Flotation time: kinetic, obtaining concentrates at 0.5, 1, 2, and 5 minutes

The flotation tests were carried out in a 2.2-litre Denver flotation cell as shown in the image, with natural airflow and regulated frothing agent quantity (MIBC) according to the need for froth in the opinion of the metallurgy technician.

Different flotation tests were performed on the samples received under these conditions. The following results were obtained:

3.2.1. COR22MIN001 sample (average grade).

COR22MIN001 is an average grade sample in terms of nickel and copper content. The metallurgy balances of the two kinetic tests performed are the following:

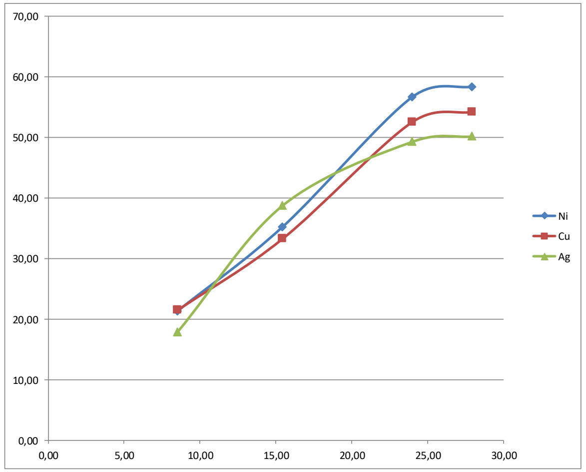


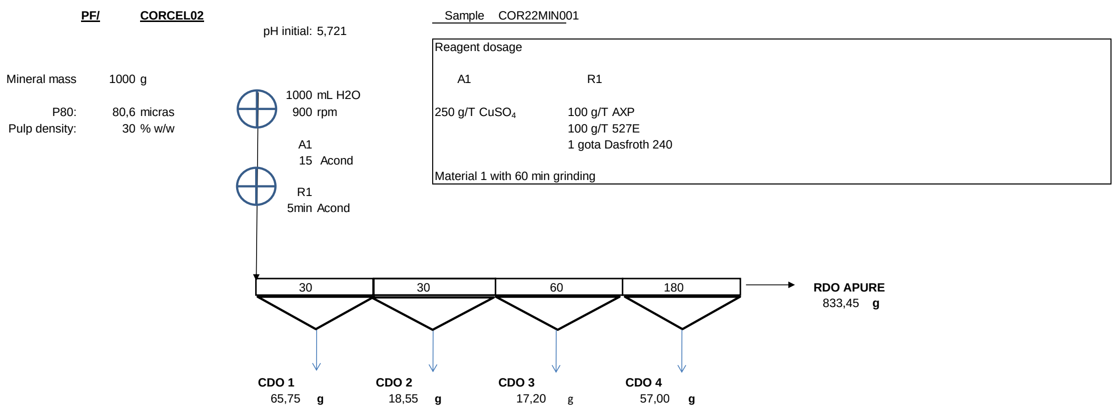
ANALYTICAL RESULTS

	Ni (mg/kg)	Cu (mg/kg)	Ag (mg/kg)	As (mg/kg)	S (mg/kg)	Fe (%)	Al (%)	Cr (mg/kg)	Mg (%)	Mn (mg/kg)	S^{2-} (%)	Mass (g)	Time (seg)
CDO 1	8614,39	2419,97	4,08	4,72	16071,79	9,17	1,1	865	12	1011	0,58	83,00	30
CDO 2	6918,72	1633,23	5,87	4,83	12410,20	9,25	1,0	934	12	998	0,44	67,15	30
CDO 3	8649,46	2162,57	2,40	6,90	17815,63	9,88	1,2	979	13	985	0,25	82,85	60
CDO 4	1527,52	414,79	0,44	2,13	2802,15	2,95	0,4	329	4	319	0,67	38,25	180
RDO APURE	1990,52	609,75	1,34	3,79	3253,95	8,39	1,1	1026	13	865	0,06	700,65	
Cab.Analyzed	3422,35	902,96	4,51	4,32	6989,15	8,83	1,3	1040	13	919	0,17	971,90	
Cab. Calculated	3446,11	959,75	1,94	4,14	6204,74	8,43	1,1	974	13	875	0,17	971,90	
Rep.CDO	**58,36**	**54,20**	**50,18**	**34,01**	**62,19**	**28,23**	**25,90**	**24,10**	**24,58**	**28,77**	**74,69**	**27,9**	

	Ni (mg/kg)	Cu (mg/kg)	Ag (mg/kg)	As (mg/kg)	S (mg/kg)	Fe (%)	Al (%)	Cr (mg/kg)	Mg (%)	Mn (mg/kg)	S2- (%)
CDO global	7206	1864	3,50	5,05	13827	8,53	1,0	841	11	902	0,46

% Extraction	Ni	Cu	Ag	As	S	Fe	Al	Cr	Mg	Mn	S2-	Mass
CDO 1	21,35	21,53	17,91	9,74	22,12	9,29	8,52	7,58	8,16	9,87	28,99	8,54
CDO 2	35,22	33,29	38,76	17,78	35,94	16,87	15,24	14,21	14,75	17,74	46,78	15,45
CDO 3	56,62	52,50	49,29	31,99	60,42	26,85	24,49	22,77	23,21	27,34	59,25	23,97
CDO 4	58,36	54,20	50,18	34,01	62,19	28,23	25,90	24,10	24,58	28,77	74,69	27,91



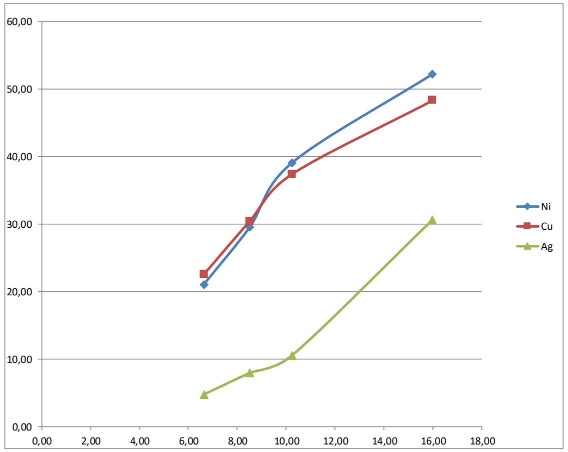


ANALYTICAL RESULTS

	Ni (mg/kg)	Cu (mg/kg)	Ag (mg/kg)	As (mg/kg)	S (mg/kg)	Fe (%)	Al (%)	Cr (mg/kg)	Mg (%)	Mn (mg/kg)	S^{2-} (%)	Mass (g)	Time (seg)
	18661	3772	2,87	10,02	33069	10,25	1,2	1085	13	1022	1,27		
CDO 1	10719	3174	1,36	3,58	20276	9,23	1,1	811	13	974	0,84	65,75	30
CDO 2	15268	3940	3,26	9,18	29035	10,04	1,2	1098	13	1007	1,31	18,55	30
CDO 3	18661	3772	2,87	10,02	33069	10,25	1,2	1085	13	1022	1,27	17,20	60
CDO 4	7738	1777	6,71	5,30	14964	8,78	1,0	906	11	876	0,53	57,00	180
RDO APURE	1925	575	1,58	2,97	2814	8,73	1,5	1216	14	935	0,02	833,45	
Cab.Analyzed	3422	903	4,51	4,32	6989	8,83	1,3	1040	13	919	0,17	991,95	
Cab. Calculated	3382	935	1,91	3,38	5685	8,82	1,4	1166	14	937	0,15	991,95	
Rep.CDO	**52,16**	**48,31**	**30,61**	**26,26**	**58,40**	**16,81**	**12,51**	**12,44**	**13,73**	**16,16**	**88,76**	**16,0**	

	Ni (mg/kg)	Cu (mg/kg)	Ag (mg/kg)	As (mg/kg)	S (mg/kg)	Fe (%)	Al (%)	Cr (mg/kg)	Mg (%)	Mn (mg/kg)	S2- (%)
CDO global	11041	2826	3,67	5,55	20779	9,28	1,1	908	12	948	0,83

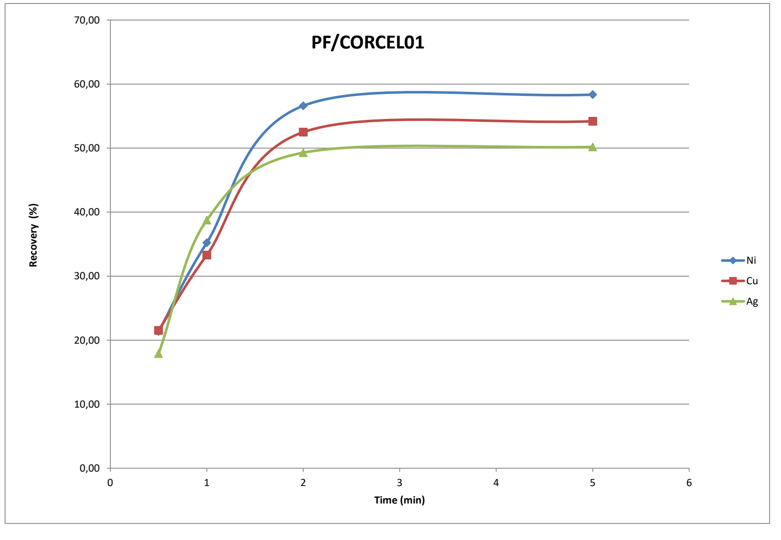
% Extraction	Ni	Cu	Ag	As	S	Fe	Al	Cr	Mg	Mn	S2-	Mass
CDO 1	21,01	22,51	4,69	7,03	23,64	6,94	5,45	4,61	6,01	6,89	37,25	6,63
CDO 2	29,45	30,39	7,87	12,11	33,19	9,07	7,12	6,37	7,74	8,90	53,64	8,50
CDO 3	39,02	37,38	10,47	17,25	43,28	11,08	8,58	7,98	9,32	10,79	68,38	10,23
CDO 4	52,16	48,31	30,61	26,26	58,40	16,81	12,51	12,44	13,73	16,16	88,76	15,98

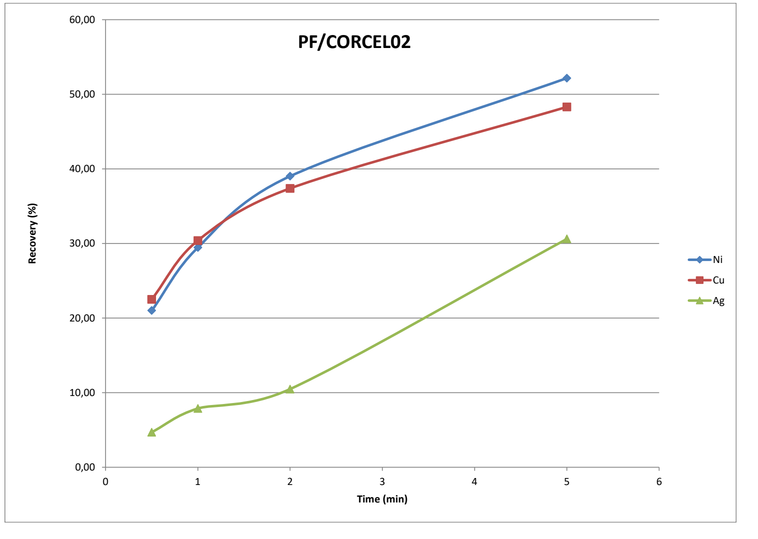


Under these conditions, it was possible to verify several behaviours observed during flotation. On one hand, it was observed how the flotation yield of the sample ground for less time was greater than for the sample ground for more time. This means that the P80 achieved in the grind is close to the particle release size, and that continuing to grind this sample has the effect of cleaning the material, which is evidenced by the lower mass recovery and increased grade of the concentrations in the second test, which happens because the minerals in question are associated to fewer gangue particles.

On the other hand, it is also observed that, in both flotations, the S sulphide level in the residue is quite low, which could suggest that there are species that carry nickel and copper associated to a type of mineralisation different to typical sulphides. This same result shows the difference between the recovery of sulphides in the concentrates (74% and 88%) and the recovery of nickel and copper (58.36/54.20% and 52.10/48.31% respectively).

In terms of the metal recovery to mass recovery curve, in the first test the mineral appears to run out, incorporating mass without significantly increasing the metal level. In the case of the second test, this effect is less pronounced, and in terms of the total mass recovery, the explanation is that the material is cleaner, though its activation is worse. If we look at the kinetic curve, we see a very similar behaviour, with the start of an asymptotic recovery curve against the flotation time.





3.2.2. COR22MIN002 sample (low grade).

PF/ CORCEL03

Sample COR22MIN002

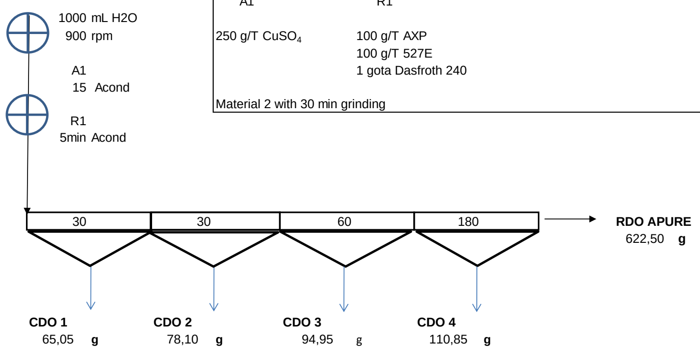
pH initial: 5,721

Mineral mass 1000 g
P80: 85,9 micras
Pulp density: 30 % w/w

Reagent dosage

A1	R1
250 g/T $CuSO_4$	100 g/T AXP 100 g/T 527E 1 gota Dasfroth 240

Material 2 with 30 min grinding

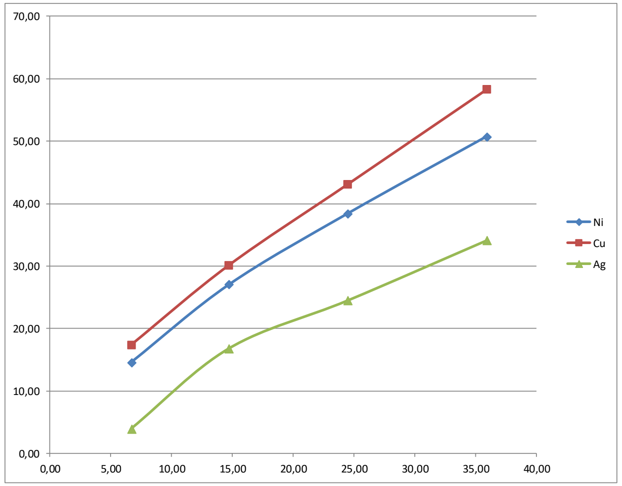


ANALYTICAL RESULTS

	Ni (mg/kg)	Cu (mg/kg)	Ag (mg/kg)	As (mg/kg)	S (mg/kg)	Fe (%)	Al (%)	Cr (mg/kg)	Mg (%)	Mn (mg/kg)	S^{2-} (%)	Mass (g)	Time (seg)
CDO 1	4795	779	1,18	10,05	5816	6,14	1,1	2014	12	784	0,09	65,05	30
CDO 2	3409	477	3,24	5,61	3764	6,13	1,0	1954	11	778	0,05	78,10	30
CDO 3	2565	399	1,59	5,17	2829	6,09	1,0	1946	11	777	0,02	94,95	60
CDO 4	2379	400	1,70	5,96	2655	5,89	0,9	1841	11	753	0,00	110,85	180
RDO APURE	1693	196	2,08	5,44	1606	6,31	1,1	1927	12	772	-0,02	622,50	
Cab.Analyzed	2240	224	3,85	5,17	2382	5,89	1,1	1803	12	746	0,00	971,45	
Cab. Calculated	2202	300	2,02	5,80	2301	6,22	1,0	1927	12	772	0,00	971,45	
Rep.CDO	**50,73**	**58,29**	**34,11**	**39,85**	**55,26**	**34,91**	**34,52**	**35,92**	**33,67**	**35,89**	**-1472,96**	**35,9**	

	Ni (mg/kg)	Cu (mg/kg)	Ag (mg/kg)	As (mg/kg)	S (mg/kg)	Fe (%)	Al (%)	Cr (mg/kg)	Mg (%)	Mn (mg/kg)	S2- (%)
CDO global	3111	488	1,92	6,43	3540	6,04	1,0	1927	11	771	0,03

% Extraction	Ni	Cu	Ag	As	S	Fe	Al	Cr	Mg	Mn	S2-	Mass
CDO 1	14,58	17,36	3,92	11,61	16,93	6,61	6,99	7,00	6,50	6,81	-739,67	6,70
CDO 2	27,02	30,13	16,79	19,39	30,08	14,53	14,82	15,15	14,11	14,91	-1233,04	14,74
CDO 3	38,41	43,11	24,49	28,12	42,10	24,11	24,09	25,02	23,38	24,76	-1472,96	24,51
CDO 4	50,73	58,29	34,11	39,85	55,26	34,91	34,52	35,92	33,67	35,89	-1472,96	35,92



PF/ **CORCEL04**

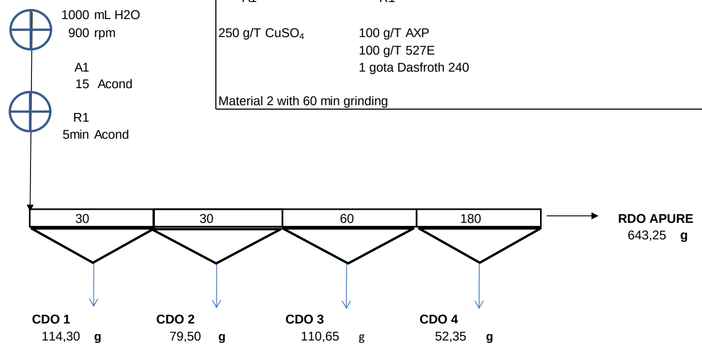
Sample COR22MIN002

pH initial: 5,721

Mineral mass 1000 g

P80: 71,4 micras
Pulp density: 30 % w/w

Reagent dosage	
A1	R1
250 g/T $CuSO_4$	100 g/T AXP 100 g/T 527E 1 gota Dasfroth 240
Material 2 with 60 min grinding	



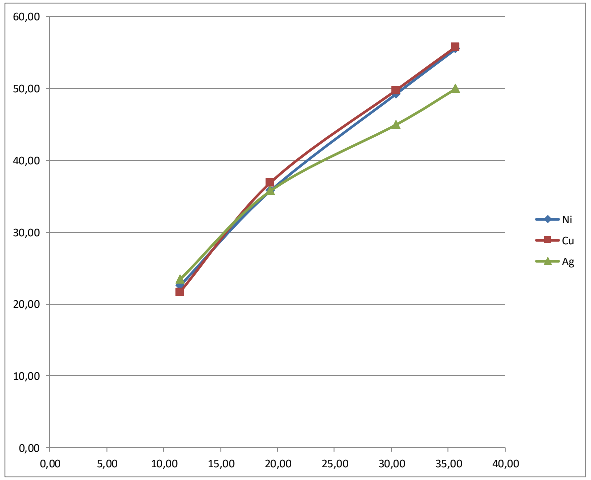
ANALYTICAL RESULTS

52,35

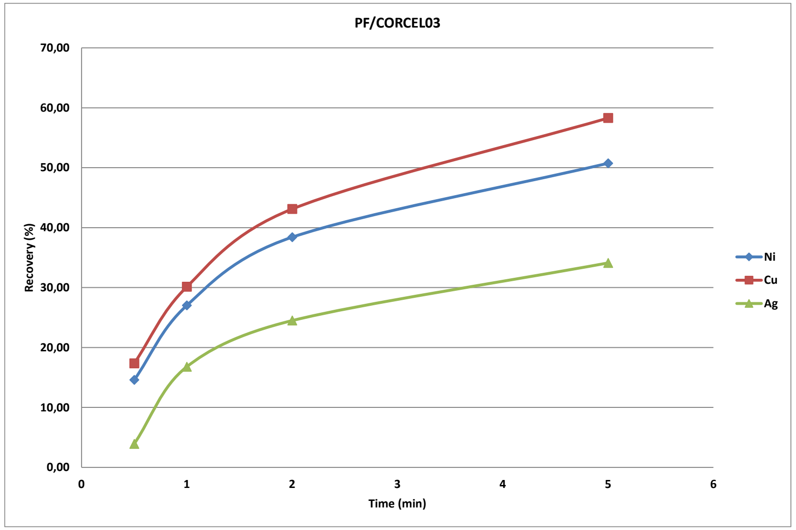
	Ni (mg/kg)	Cu (mg/kg)	Ag (mg/kg)	As (mg/kg)	S (mg/kg)	Fe (%)	Al (%)	Cr (mg/kg)	Mg (%)	Mn (mg/kg)	S^{2-} (%)	Mass (g)	Time (seg)
CDO 1	4637	560	2,39	9,06	5030	5,92	1,0	1913	12	800	0,05	114,30	30
CDO 2	3895	566	1,80	7,71	4376	5,81	0,9	1807	12	789	0,02	79,50	30
CDO 3	2861	345	0,97	8,16	3044	6,00	0,8	1695	11	769	0,03	110,65	60
CDO 4	2800	340	1,11	5,55	2910	5,87	0,8	1702	11	763	0,05	52,35	180
RDO APURE	1625	204	0,91	12,29	1486	6,35	1,1	2145	13	821	0,07	643,25	
Cab.Analyzed	2240	224	3,85	5,17	2382	5,89	1,1	1803	12	746	0,00	1000,05	
Cab. Calculated	2348	296	1,17	10,75	2368	6,20	1,0	2018	13	807	0,06	1000,05	
Rep.CDO	**55,49**	**55,74**	**49,96**	**26,45**	**59,64**	**34,05**	**30,35**	**31,66**	**32,62**	**34,59**	**22,73**	**35,7**	

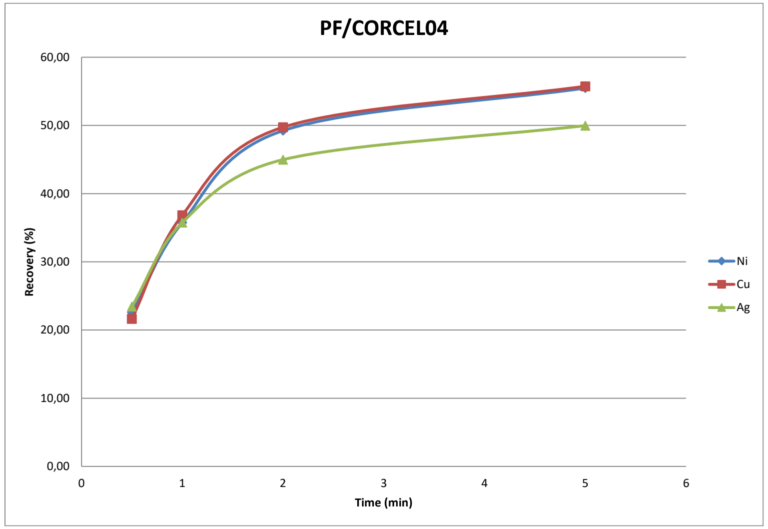
	Ni (mg/kg)	Cu (mg/kg)	Ag (mg/kg)	As (mg/kg)	S (mg/kg)	Fe (%)	Al (%)	Cr (mg/kg)	Mg (%)	Mn (mg/kg)	S2- (%)
CDO global	3651	462	1,63	7,97	3957	5,91	0,9	1791	12	782	0,04

% Extraction	Ni	Cu	Ag	As	S	Fe	Al	Cr	Mg	Mn	S2-	Mass
CDO 1	22,57	21,63	23,45	9,64	24,28	10,93	11,18	10,83	10,88	11,33	9,81	11,43
CDO 2	35,76	36,84	35,75	15,35	38,98	18,38	17,91	17,95	18,19	19,10	12,54	19,38
CDO 3	49,24	49,73	44,97	23,75	53,20	29,09	26,28	27,24	27,97	29,64	18,23	30,44
CDO 4	55,49	55,74	49,96	26,45	59,64	34,05	30,35	31,66	32,62	34,59	22,73	35,68



In the case of the low-grade material, we observed kinetic behaviour similar to the medium grade material, with differences in the behaviour of the copper. In the case of nickel, we observed that the level reached in the residue is of the same order as in the average grade material. On a kinetic level, we observed that the asymptotic behaviour started to be reflected, although the metal recovery to mass recovery curve continues to allow for the possibility of the concentrate "quickening".





Another data point similar to the average grade material is the residual concentration and behaviour of S in the form of sulphides. Like in the first two tests, the S2- level in the residue is extremely low, showing that the material has been cleaned of said mineral species.

In addition to these two tests, an additional one was performed in which the activator concentration was doubled (from 500 g/T to $CuSO_4$) and a final stage was added, Concentrate 5, in which the same reactants were added as in the first stage. In this case we can observe how the kinetics of the process slows down with the addition of the excess activator. On the other hand, it is observed that, despite adding more collector to the residual amount of nickel, the residue is similar to previous tests.

PF/ **CORCEL07**

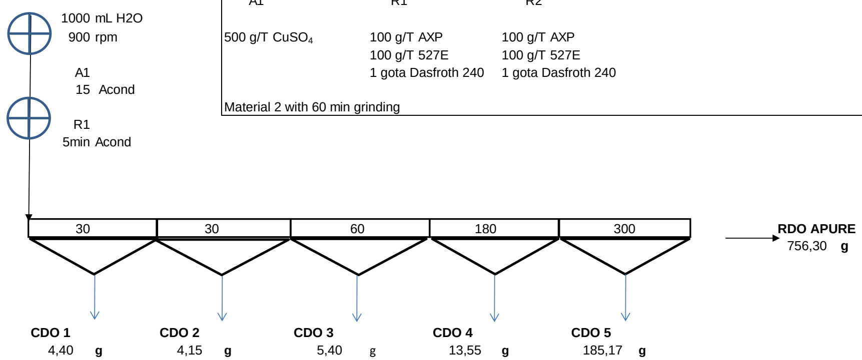
Sample COR22MIN002

pH initial: 5,721

Reagent dosage		
A1	R1	R2
500 g/T $CuSO_4$	100 g/T AXP 100 g/T 527E 1 gota Dasfroth 240	100 g/T AXP 100 g/T 527E 1 gota Dasfroth 240
Material 2 with 60 min grinding		

Mineral mass 1000 g

P80: 71,4 micras
Pulp density: 30 % w/w



ANALYTICAL RESULTS

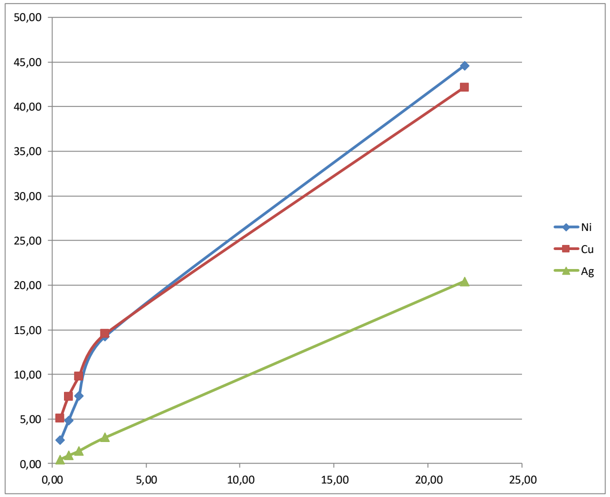
	Ni (mg/kg)	Cu (mg/kg)	Ag (mg/kg)	As (mg/kg)	S (mg/kg)	Fe (%)	Al (%)	Cr (mg/kg)	Mg (%)	Mn (mg/kg)	Mass (g)	Time (seg)
CDO 1	13113	4246	1,13	85,61	20243	6,29	1,1	1843	13	835	4,40	30
CDO 2	11819	2138	1,04	67,45	14914	6,08	1,1	1914	12	835	4,15	30
CDO 3	11434	1492	0,98	61,03	12671	6,05	1,1	2049	13	846	5,40	60
CDO 4	10963	1295	1,16	65,68	12876	6,14	1,1	2015	12	832	13,55	180
CDO 5	3639	546	0,98	13,93	3881	5,85	1,0	2016	12	842	185,17	300
RDO APURE	1628	280	1,09	5,95	1555	5,91	0,7	1790	11	786	756,30	

Cab.Analyzed	2240	224	3,85	5,17	2382	5,89	1,1	1803	12	746	968,97
Cab. Calculated	2294	378	1,07	9,25	2362	5,90	0,8	1839	11	798	968,97

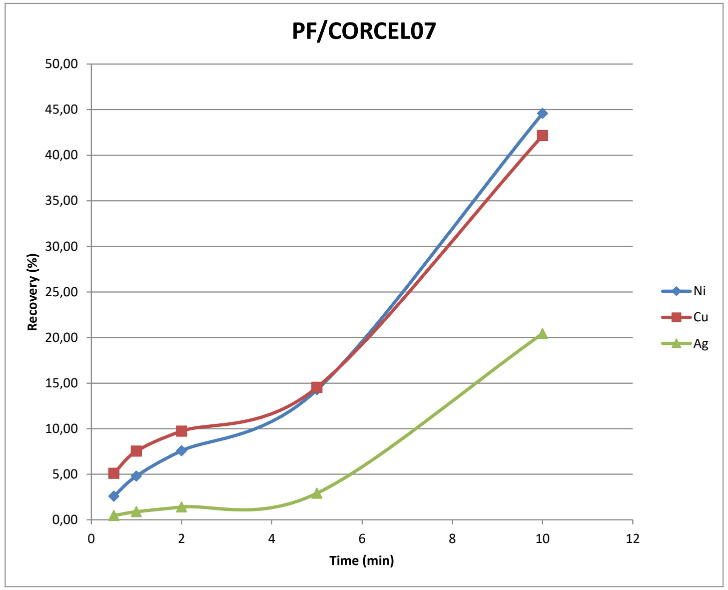
Rep.CDO	**44,59**	**42,15**	**20,43**	**49,74**	**48,61**	**21,89**	**27,13**	**24,01**	**23,89**	**23,14**	**21,9**

	Ni (mg/kg)	Cu (mg/kg)	Ag (mg/kg)	As (mg/kg)	S (mg/kg)	Fe (%)	Al (%)	Cr (mg/kg)	Mg (%)	Mn (mg/kg)
CDO global	4660	725	1	21	5231	6	1	2012	12	841

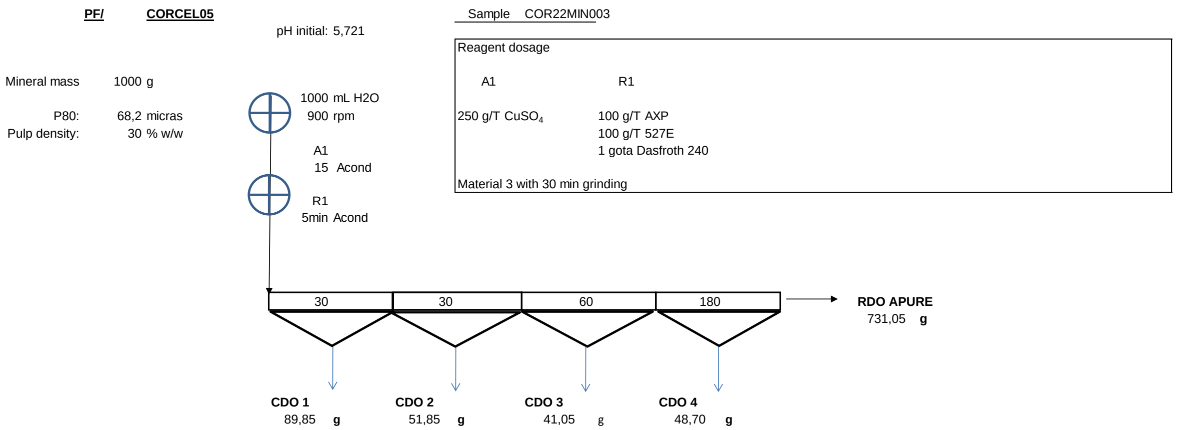
% Extraction	Ni	Cu	Ag	As	S	Fe	Al	Cr	Mg	Mn	Mass
CDO 1	2,60	5,11	0,48	4,20	3,89	0,48	0,64	0,46	0,54	0,48	0,45
CDO 2	4,80	7,53	0,90	7,33	6,60	0,93	1,22	0,90	1,00	0,92	0,88
CDO 3	7,58	9,73	1,41	11,01	9,58	1,50	1,98	1,52	1,65	1,51	1,44
CDO 4	14,27	14,53	2,92	20,94	17,21	2,95	3,91	3,05	3,20	2,97	2,84
CDO 5	44,59	42,15	20,43	49,74	48,61	21,89	27,13	24,01	23,89	23,14	21,95



Below we can see the recovery against time graph for this test:



3.2.3. COR22MIN003 sample (high grade).



ANALYTICAL RESULTS

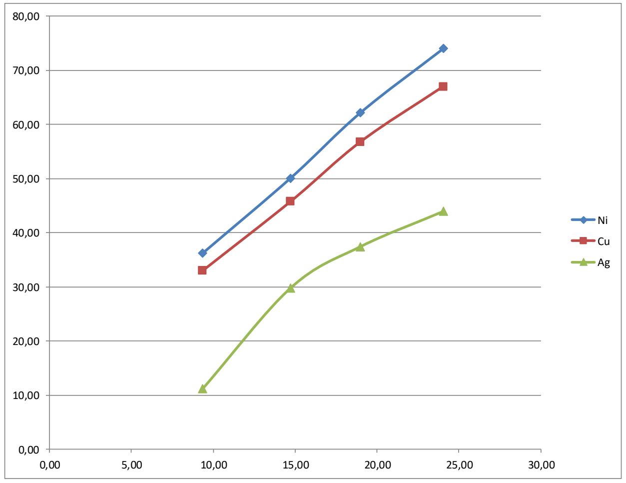
	Ni (mg/kg)	Cu (mg/kg)	Ag (mg/kg)	As (mg/kg)	S (mg/kg)	Fe (%)	Al (%)	Cr (mg/kg)	Mg (%)	Mn (mg/kg)	S^{2-} (%)	Mass (g)	Time (seg)
CDO 1	22066	5912	1,91	12,09	40759	8,06	0,7	1708	8	479	2,09	89,85	30
CDO 2	14710	3972	5,54	10,50	29394	6,89	0,8	1645	7	532	1,15	51,85	30
CDO 3	16115	4307	2,86	8,77	30893	7,23	0,9	1845	8	583	1,25	41,05	60
CDO 4	13314	3372	2,06	7,83	24573	6,59	0,9	1817	8	580	0,21	48,70	180
RDO APURE	1939	725	1,18	6,18	3325	5,17	0,9	2227	9	606	0,05	731,05	

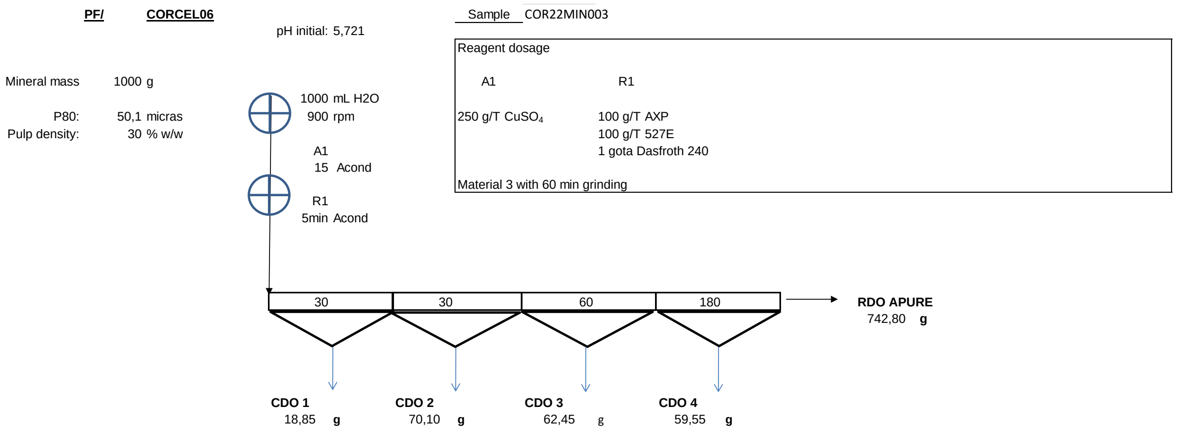
Cab.Analyzed	5754	1611	4,73	5,02	11660	5,54	0,9	1985	9	579	0,37	962,50
Cab. Calculated	5686	1671	1,60	7,16	10474	5,70	0,9	2110	9	588	0,36	962,50

Rep.CDO	**74,10**	**67,04**	**44,02**	**34,43**	**75,89**	**31,00**	**21,47**	**19,84**	**20,25**	**21,69**	**89,42**	**24,0**

	Ni (mg/kg)	Cu (mg/kg)	Ag (mg/kg)	As (mg/kg)	S (mg/kg)	Fe (%)	Al (%)	Cr (mg/kg)	Mg (%)	Mn (mg/kg)	S2- (%)
CDO global	17521	4658	2,92	10,25	33057	7,34	0,8	1741	8	530	1,33

% Extraction	Ni	Cu	Ag	As	S	Fe	Al	Cr	Mg	Mn	S2-	Mass
CDO 1	36,23	33,03	11,19	15,76	36,33	13,22	7,62	7,55	7,80	7,60	54,35	9,34
CDO 2	50,16	45,84	29,87	23,67	51,44	19,73	12,23	11,75	12,02	12,48	71,61	14,72
CDO 3	62,25	56,83	37,50	28,90	64,02	25,15	16,50	15,48	15,80	16,71	86,46	18,99
CDO 4	74,10	67,04	44,02	34,43	75,89	31,00	21,47	19,84	20,25	21,69	89,42	24,05





ANALYTICAL RESULTS

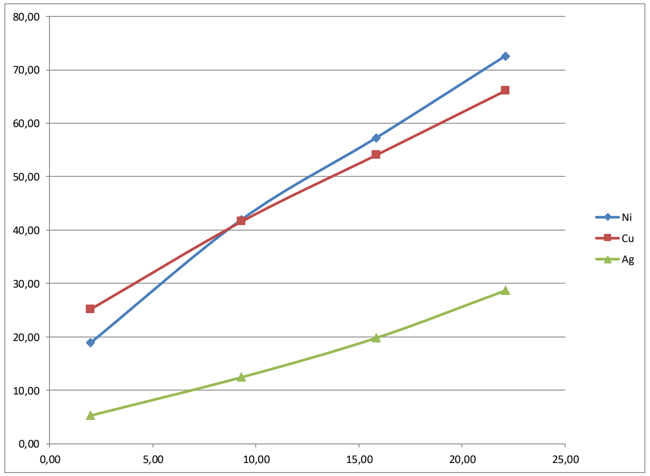
	Ni (mg/kg)	Cu (mg/kg)	Ag (mg/kg)	As (mg/kg)	S (mg/kg)	Fe (%)	Al (%)	Cr (mg/kg)	Mg (%)	Mn (mg/kg)	S^{2-} (%)	Mass (g)	Time (seg)
CDO 1	53563	22281	6,10	36,38	116637	15,29	0,7	1468	7	485	7,02	18,85	30
CDO 2	17663	3924	2,22	10,27	33649	7,44	0,8	1957	8	508	1,55	70,10	30
CDO 3	13147	3334	2,55	10,60	26709	6,91	0,9	1822	9	545	1,06	62,45	60
CDO 4	13726	3365	3,21	7,19	26590	6,67	0,9	1869	9	575	1,07	59,55	180
RDO APURE	1978	761	2,08	2,67	3663	5,98	1,3	2589	11	686	0,06	742,80	

Cab.Analyzed	5754	1611	4,73	5,02	11660	5,54	0,9	1985	9	579	0,37	953,75
Cab. Calculated	5615	1750	2,27	4,70	11040	6,37	1,2	2426	11	653	0,44	953,75

Rep.CDO	**72,57**	**66,13**	**28,67**	**55,70**	**74,16**	**26,95**	**15,70**	**16,86**	**17,38**	**18,17**	**89,27**	**22,1**

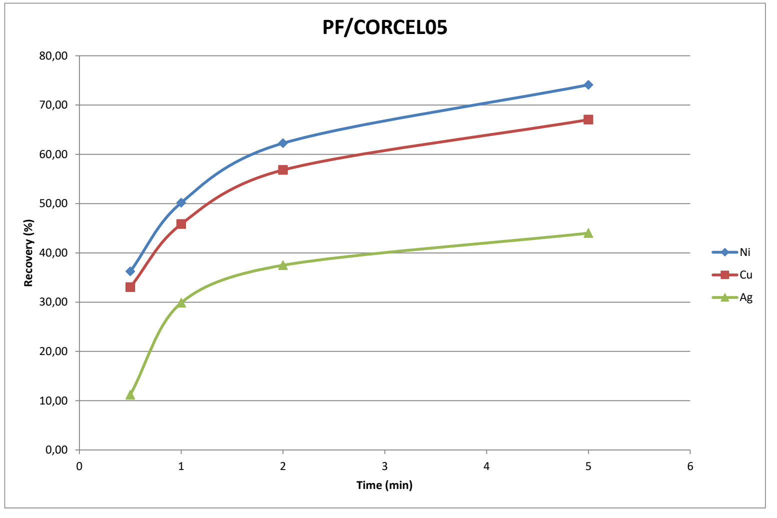
	Ni (mg/kg)	Cu (mg/kg)	Ag (mg/kg)	As (mg/kg)	S (mg/kg)	Fe (%)	Al (%)	Cr (mg/kg)	Mg (%)	Mn (mg/kg)	S2- (%)
CDO global	18422	5232	2,94	11,83	37017	7,76	0,9	1848	8	536	1,76

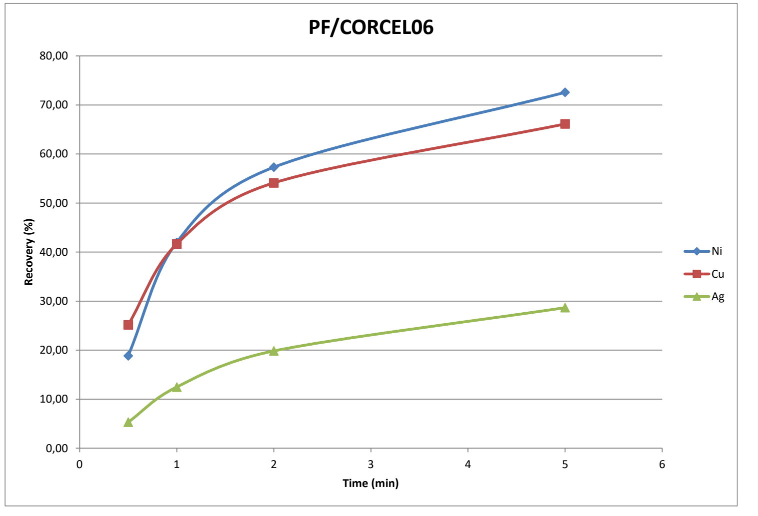
% Extraction	Ni	Cu	Ag	As	S	Fe	Al	Cr	Mg	Mn	S2-	Mass
CDO 1	18,85	25,17	5,31	15,30	20,88	4,74	1,16	1,20	1,26	1,47	31,85	1,98
CDO 2	41,97	41,65	12,48	31,37	43,28	13,32	6,04	7,13	6,83	7,19	58,00	9,33
CDO 3	57,31	54,12	19,84	46,14	59,12	20,41	10,89	12,04	12,15	12,66	73,94	15,87
CDO 4	72,57	66,13	28,67	55,70	74,16	26,95	15,70	16,86	17,38	18,17	89,27	22,12



In the high-grade mineral, we continue to observe that the ratio between the metal recovery level and the mass recovery level remains linear during flotation, and we therefore cannot assume that there are species that are much more favoured in terms of activation compared to others.

On a kinetic level, we again see the same phenomenon as with the low-grade material, with a kinetic curve approaching asymptotic environments (but not reaching them).





The results of the grinding study again show that the effect of increasing the grinding intensity does not have a significant effect on the yield of the operation. It only cleans the material a little more, given that the mass recovery is lower, with a similar level of metal recovery.

In addition to these two tests, an additional one was performed in which the activator concentration was doubled (from 500 g/T to $CuSO_4$) and a final stage was added, Concentrate 5, in which the same reactants were added as in the first stage.

PF/ **CORCEL08**

Sample COR22MIN003

pH initial: 5,721

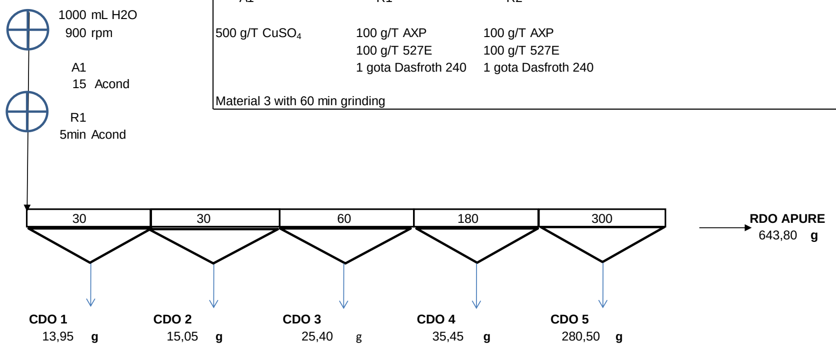
Mineral mass 1000 g

P80: 50,1 micras

Pulp density: 30 % w/w

Reagent dosage		
A1	R1	R2
500 g/T $CuSO_4$	100 g/T AXP 100 g/T 527E 1 gota Dasfroth 240	100 g/T AXP 100 g/T 527E 1 gota Dasfroth 240

Material 3 with 60 min grinding



ANALYTICAL RESULTS

52,35

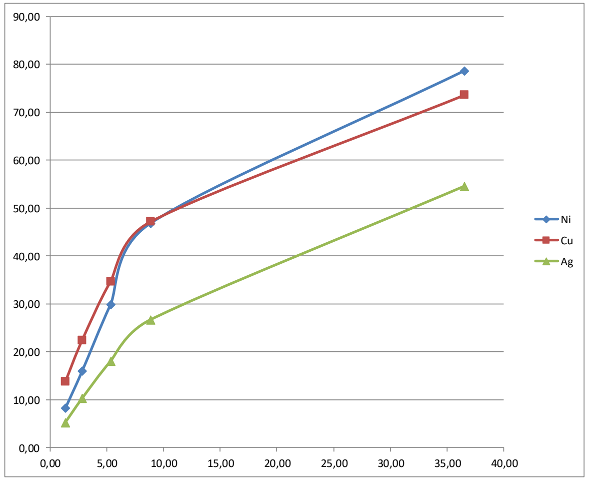
	Ni (mg/kg)	Cu (mg/kg)	Ag (mg/kg)	As (mg/kg)	S (mg/kg)	Fe (%)	Al (%)	Cr (mg/kg)	Mg (%)	Mn (mg/kg)	Mass (g)	Time (seg)
CDO 1	35475	16893	3,71	23,82	72710	10,61	0,8	1678	7	537	13,95	30
CDO 2	31118	9897	3,31	20,86	61010	9,25	0,7	1731	7	489	15,05	30
CDO 3	33011	8288	3,02	21,40	62129	9,67	0,8	1891	8	504	25,40	60
CDO 4	28742	6024	2,42	17,39	49498	8,88	0,7	2135	9	495	35,45	180
CDO 5	6840	1617	0,98	5,02	11205	5,50	0,8	2102	8	617	280,50	300
RDO APURE	1995	702	0,70	3,29	3291	4,98	0,5	2097	7	499	643,80	

Cab.Analyzed	5754	1611	4,73	5,02	11660	5,54	0,9	1985	9	579	1014,15
Cab. Calculated	5940	1690	0,98	5,26	10380	5,52	0,6	2083	8	532	1014,15

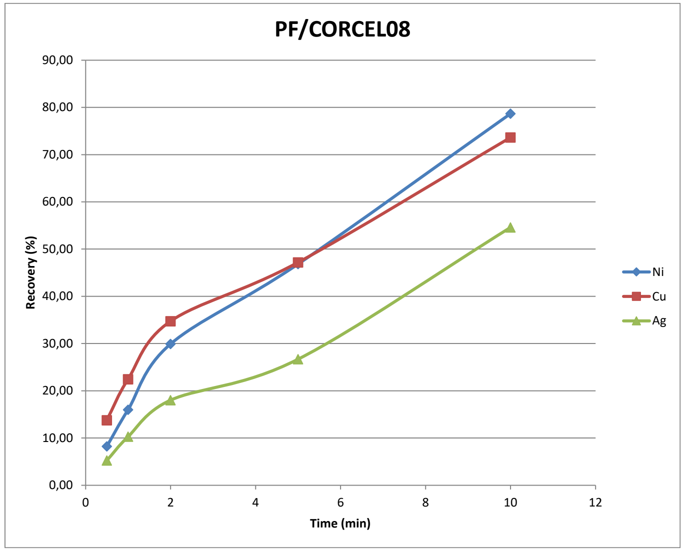
Rep.CDO	**78,68**	**73,63**	**54,58**	**60,27**	**79,87**	**42,72**	**43,93**	**36,10**	**39,86**	**40,46**	**36,5**

	Ni (mg/kg)	Cu (mg/kg)	Ag (mg/kg)	As (mg/kg)	S (mg/kg)	Fe (%)	Al (%)	Cr (mg/kg)	Mg (%)	Mn (mg/kg)
CDO global	12796	3408	1	9	22704	6	1	2060	8	589

% Extraction	Ni	Cu	Ag	As	S	Fe	Al	Cr	Mg	Mn	Mass
CDO 1	8,22	13,75	5,23	6,23	9,64	2,64	1,66	1,11	1,33	1,39	1,38
CDO 2	15,99	22,44	10,27	12,12	18,36	5,13	3,29	2,34	2,74	2,75	2,86
CDO 3	29,91	34,71	18,01	22,31	33,35	9,52	6,33	4,61	5,26	5,13	5,36
CDO 4	46,83	47,17	26,68	33,88	50,02	15,14	10,47	8,20	9,35	8,38	8,86
CDO 5	78,68	73,63	54,58	60,27	79,87	42,72	43,93	36,10	39,86	40,46	36,52



We can see how adding more reactants has led us to a concentrate with higher concentrations of nickel, copper, and silver. Nevertheless, the mass recovery has been greater, and therefore the concentration of the metal of interest in the global concentrate has gone down. The Ni content in the residue was similar to what was obtained in previous tests.



3.3) Acid lixiviation test.

The scope of these preliminary works following the recovery of nickel and copper also included the possibility of applying acid lixiviation to the flotation residue that was obtained. In this case the flotation residue from test PF/CORCEL05 was chosen as it was the test with the best yield in terms of recovery of metals of interest.

It is worth highlighting, as indicated in point 3.2, that all flotation residues obtained appear to have a similar nickel content. Other elements such as copper do have a slightly different behaviour, with residues having a growing copper concentration as the material has greater head grade.

Once the material on which to perform the lixiviation test was defined, the test was performed, using H_2SO_4 at 10% as the lixiviation agent with a pulp density of 30% w/w and at ambient temperature. The other test conditions are listed below:

H_2SO_4(%)	Tª (ºC)	Mass mineral (g)	Initial sample (Ni, mg/kg)	Vol lix (l)	Masa lix (g)	Flask weight (g)	$Total_O$ (g)	$Total_F$ (g)
10	amb	300,1500	1939,00	0,7	705,7	493,80	1499,6	1496,35

The results of the resulting products (liquors and lixiviation residue) from the test are the following:

Liquor final (g)	ρ (g/ml)	Vol Liquor final (L)	Final residue (g)	[Ni] in liquor (mg/l)	[Ni] in residue (mg/kg)	% NI extraction (liq)	% Ni extraction (sol)
713,70	1,01	0,708	288,85	164,709	1540,0	20,04	23,57

It can be observed that the nickel extraction level using the solid and liquid calculations are similar. There is around 20% nickel in the flotation residue, which is relatively low for the desired objective. In the case of copper, though it was outside the scope of the study, it is also included in this document, and the results are as follows:

Liquor final (g)	ρ (g/ml)	Vol Liquor final (L)	Final residue (g)	[Cu] in liquor (mg/l)	[Cu] in residue (mg/kg)	% Cu extraction (liq)	% Cu extraction (sol)
713,70	1,01	0,708	288,85	144,75	432,7	47,09	42,56

In this case, it can be seen that copper is more mobile than nickel and recovery (even though it is low) is more than twice that of the target metal.

4. CONCLUSIONS AND RECOMMENDATIONS

- Several preliminary tests have been carried out on 3 different samples with different grades of copper and nickel.

- The flotation tests show that, the higher the material great, the more Ni and Cu recovery is possible, and an approximate Ni residue remains in all tests (0.19%).

- Regarding the recovery of Ni by flotation, in general we can say that it is positive and it is in the usual values for this type of mineralization, obtaining the following recoveries for the different samples analyzed:
    - High grade sample: 75% recovery.
    - Half-grade sample: 55% recovery.
    - Low grade sample: 52% recovery.

- The sulphide content observed in the flotation residues are very low compared to the grade and concentrates. This could indicate that the residual nickel in the residues is not found in sulphur species.

- Except for some exceptions, flotation kinetics in all cases indicate that the material may be susceptible to floating. This flotation must be approached on the basis of increasing the reactant dose or, alternatively, performing sequential dosing, since at the end of the flotation time almost no froth was being generated.

- The reactants whose doses should be reviewed are the flotation collector (AXK and Aero 527 mixture) as the activator, due to its key role in adapting the floating nickel particles (pentlandite).

- Grinding the material appears to indicate that the concentrate is cleaned; however, increasing recovery does not produce the expected results. This may indicate the grinding is not completely effective, or that it is effective, but a new surface is being generated that can float, so other conditions should be modified.

- It is highly recommended to perform a mineral study to find out the particle distribution, mineral association, and especially the mineral species of the particles that carry copper and nickel.

- Lixiviation was carried out at ambient temperature without associated kinetics. We recommend performing lixiviation under more intense conditions (temperature) and perform the kinetic analysis to verify if conditions are due to material running out or it is because of the employed conditions (reactants).

5. CERTIFICATION

Miguel A. Mejias, Laboratory Director of AGQ Mining & Bioenergy,

CERTIFIES

On 09 December 2022, that the results in this report correspond to the indicated date and time, using the procedures and equipment described and performed on the samples provided by Corcel Minerals, S.L.

MIGUEL A. MEJÍAS
PERSON RESPONSIBLE. AGQ M&B LABORATORY

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