

Report of analysis P-2022/0413 / A-2022/3078

from 17.01.2023 (Version 2)

Customer: Aurora Lith. S.A.
Rua Tomás da Fonseca Torre C
1600-2009 Lisboa

Sampling date: Not specified

Receipt of sample: 15.11.2022

Start of analyses: 08.12.2022

End of analyses: 12.01.2023

Sample code	Sample type	Sample name
645433	Gypsum	Li Process Liquor SO4

Changes to Version 1 report from 12.01.2023:

Results of PSD and thermal analysis added.

The test results are listed on the next page

signed: Roland Pierkes, Project manager

Duesseldorf, 17.01.2023

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Sample code: 645433

Sample name: Li Process Liquor SO4

All test result refers to the sample in delivery conditions and relate to the items tested.

Test	Test method	Test result	Unit	Test date
Moisture at 40°C		23,1	%	08.12.2022

All further test result refer to the sample dried at 40°C and relate to the items tested.

Test	Test method	Test result	Unit	Test date
Carbon dioxide	A-01-082:2015 (950°C/IR)	20,75	%	21.12.2022
Water	A-01-082:2015 (950°C/IR)	13,53	%	21.12.2022
TOC	DIN EN 13639:2017	0,0660	%	21.12.2022
Chloride	DIN EN 196-2:2013	<0,007	%	21.12.2022
Fluoride	A-01-040:2012 (Seel)	0,01	%	19.12.2022
Loss on ignition	Sum CO ₂ , H ₂ O	34,35	%	22.12.2022
Silicon dioxide	EN 196-2:2013 (XRF)	0,66	%	22.12.2022
Aluminium oxide	EN 196-2:2013 (XRF)	4,41	%	22.12.2022
Titanium dioxide	EN 196-2:2013 (XRF)	0,02	%	22.12.2022
Phosphorus pentoxide	EN 196-2:2013 (XRF)	0,04	%	22.12.2022
Ferric oxide	EN 196-2:2013 (XRF)	1,04	%	22.12.2022
Manganese oxide	EN 196-2:2013 (XRF)	0,06	%	22.12.2022
Magnesium oxide	EN 196-2:2013 (XRF)	0,96	%	22.12.2022
Calcium oxide	EN 196-2:2013 (XRF)	37,80	%	22.12.2022
Sulphate as SO ₃	EN 196-2:2013 (XRF)	19,84	%	22.12.2022
Potassium oxide	EN 196-2:2013 (XRF)	<0,01	%	22.12.2022
Sodium oxide	EN 196-2:2013 (XRF)	<0,02	%	22.12.2022
Na ₂ O equivalent	EN 196-2:2013 (XRF)	<0,02	%	22.12.2022

All test results refer only to the tested items as received, required preparation steps are stated.

Methods marked by # are not accredited under this registration number. More details like measuring devices, test methods, uncertainties in measurements and further statistical parameters can be reported if required.

Samples will be disposed 3 months after submission of this report if not otherwise agreed.

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Sample name: Li Process Liquor SO4

All further test result refer to the sample dried at 40°C and relate to the items tested.

Test	Test method	Test result	Unit	Test date
Lithium	DIN EN ISO 17294-2:2017	1200	µg/g	13.01.2023
Beryllium	DIN EN ISO 17294-2:2017	7,85	µg/g	12.01.2023
Vanadium	DIN EN ISO 17294-2:2017	2,45	µg/g	12.01.2023
Chromium	DIN EN ISO 17294-2:2017	90,2	µg/g	12.01.2023
Manganese	DIN EN ISO 17294-2:2017	387	µg/g	12.01.2023
Cobalt	DIN EN ISO 17294-2:2017	0,757	µg/g	12.01.2023
Nickel	DIN EN ISO 17294-2:2017	5,32	µg/g	12.01.2023
Copper	DIN EN ISO 17294-2:2017	4,86	µg/g	12.01.2023
Zinc	DIN EN ISO 17294-2:2017	49,7	µg/g	12.01.2023
Arsenic	DIN EN ISO 17294-2:2017	0,614	µg/g	12.01.2023
Selenium	DIN EN ISO 17294-2:2017	<1,92	µg/g	12.01.2023
Molybdenum	DIN EN ISO 17294-2:2017	0,686	µg/g	12.01.2023
Silver	DIN EN ISO 17294-2:2017	<0,096	µg/g	12.01.2023
Cadmium	DIN EN ISO 17294-2:2017	0,128	µg/g	12.01.2023
Tin	DIN EN ISO 17294-2:2017	50,2	µg/g	12.01.2023
Antimony	DIN EN ISO 17294-2:2017	0,274	µg/g	12.01.2023
Tellurium	DIN EN ISO 17294-2:2017	<0,144	µg/g	12.01.2023
Barium	DIN EN ISO 17294-2:2017	2,75	µg/g	12.01.2023
Thallium	DIN EN ISO 17294-2:2017	<0,029	µg/g	12.01.2023
Lead	DIN EN ISO 17294-2:2017	3,02	µg/g	12.01.2023
Mercury	DIN EN ISO 12846:2012	<0,961	µg/g	13.01.2023

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Test	Test method	Test result	Unit	Test date
Phase analysis	X-Ray Diffraction / Rietveld			
Gypsum	XRD	40 - 45	%	12.01.2023
Calcite	XRD	45 - 50	%	12.01.2023
Quartz	XRD	< 1	%	12.01.2023
Amphibole group	XRD	< 2	%	12.01.2023
Talc	XRD	ca. 1	%	12.01.2023
Mica group	XRD	ca. 1	%	12.01.2023
Chlorite group	XRD	ca. 2	%	12.01.2023
Ca-Al-Fe-Carbohydrate ?	XRD	< 2	%	12.01.2023
Thermal analysis	DSC			
Gypsum	DSC	42,3	%	16.01.2023
Hemihydrate	DSC	0	%	16.01.2023

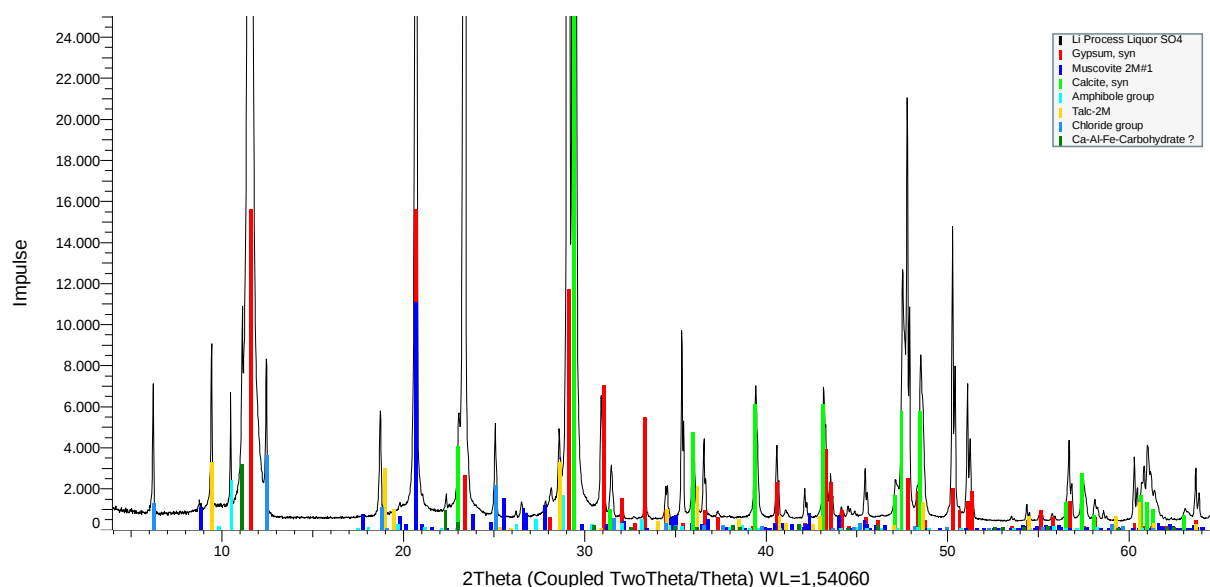


Fig. 1: X-ray diffraction pattern of sample "Li Process Liquor SO4", with phase designation

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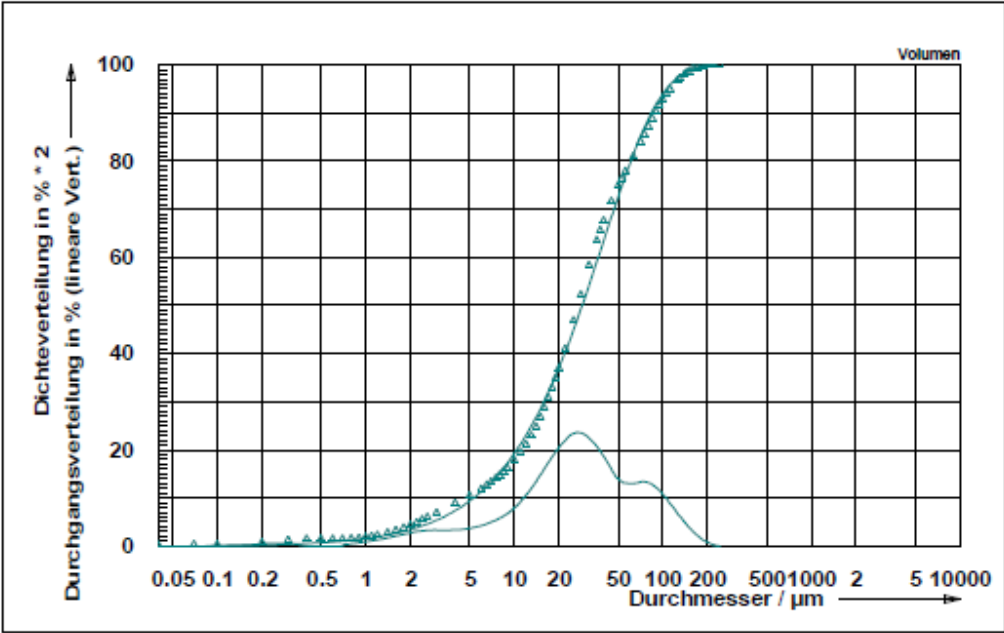


Korngrößen-Verteilung
CILAS 1190 Liquid
Bereich: 0.02 µm - 2500 µm / 100 Klassen

Probenbezeichnung: 645433	Ultraschallzeit : 60 sec
Produkt : Li Process Liquor SO4	Durchm. bei 10 % : 4.85 µm
Kunde : Aurora Lith	Durchm. bei 50 % : 26.95 µm
Bemerkungen : P-2022/0413 A-2022/3078	Durchm. bei 90 % : 89.39 µm
Flüssigkeit : Ethanol	
Spez. Oberfl. :	
Bearbeiter : FM	spez. Dichte : 1.000 g/cm³
Firma : VDZ Technology gGmbH	Auswertemodell: Fraunhofer
Ort : Abt. Umwelt und Betriebstechnik	Lagepara. (NM) : 39.79 µm
Datum : 16.12.2022 10:40:42	Steigungsmaß(NM) : 1.08
Index meas. : 11020	SOP-Name : VDZ Fraunhofer
Database name : 645433	

Benutzerdefinierte Durchmesser				in Volumen / Durchgang				
x/µm	0.02	0.10	0.30	0.50	0.70	1.00	2.00	3.00
D(x)/%	0.18	0.34	1.18	1.38	1.38	1.81	4.30	6.88
q3/%	0.18	0.16	0.84	0.20	0.00	0.43	2.49	2.59
x/µm	4.00	5.00	6.00	7.00	8.00	10.00	12.00	14.00
D(x)/%	8.82	10.39	11.84	13.26	14.70	17.72	21.07	24.74
q3/%	1.94	1.57	1.45	1.42	1.43	3.02	3.35	3.68
x/µm	16.00	20.00	28.00	32.00	40.00	45.00	56.00	63.00
D(x)/%	28.67	36.87	52.10	58.27	67.52	71.62	77.81	80.88
q3/%	3.93	8.20	15.23	6.17	9.28	4.10	6.19	3.07
x/µm	75.00	90.00	125.00	175.00	200.00	300.00	400.00	500.00
D(x)/%	85.49	90.22	98.64	99.52	99.87	100.00	100.00	100.00
q3/%	4.61	4.74	6.41	2.88	0.35	0.13	0.00	0.00
x/µm	800.00	1000	2000	4000	8000	10000	16000	20000
D(x)/%	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
q3/%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

x: Durchmesser / µm, D(x): kumulativ Werte / %, q3: Dichteverteilung / %



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