myStandards GmbH
Schauenburger Straße 116
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Germany

Preliminary Product Information Sheet

Microanalytical Reference Material

OREAS-20a*-NP

Nano-particulate pressed powder pellet

Assigned Values

Analyte	Value	Unc. (95% CL)	Unit	Method
Li	38.0	3.3	ppm	B, C
Be	3.63	0.51	ppm	B, C
C	0.054	0.005	g/100g	D
Na	2.00	0.04	g/100g	A, C
Mg	1.45	0.02	g/100g	A, B
Al	7.93	0.29	g/100g	A, B, C
Si	30.17	0.43	g/100g	A, B
P	0.100	0.002	g/100g	A, B
S	0.062	0.004	g/100g	A, C, D
K	3.31	0.07	g/100g	A, B, C
Ca	2.59	0.04	g/100g	A, B
Sc	12.3	0.4	ppm	C
Ti	0.500	0.011	g/100g	A, B
V	113	9	ppm	A, B, C
Cr	87	6	ppm	B
Mn	0.054	0.001	g/100g	A, B
Fe	3.76	0.08	g/100g	A, B
Co	13.5	0.8	ppm	B, C
Ni	39.8	2.3	ppm	B, C
Cu	45.9	3.2	ppm	B, C
Zn	69	1	ppm	C
Ga	19.5	0.7	ppm	B, C
Ge	0.17	0.04	ppm	C
As	17.0	1.1	ppm	C
Rb	233	6	ppm	B
Sr	296	26	ppm	A, B, C
Y	29.2	0.6	ppm	B
Zr	303	16	ppm	B
Nb	20.4	0.6	ppm	C
Mo	3.25	0.12	ppm	C

Assigned Values

Analyte	Value	Unc. (95% CL)	Unit	Method
Ag	0.061	0.007	ppm	C
Cd	0.086	0.007	ppm	C
In	0.050	0.003	ppm	C
Sn	4.05	0.14	ppm	B, C
Sb	0.57	0.02	ppm	C
Cs	15.3	0.5	ppm	B, C
Ba	1087	53	ppm	A, B, C
La	41.9	1.1	ppm	B
Ce	82	1	ppm	B
Pr	9.25	0.55	ppm	B, C
Nd	35.2	0.5	ppm	B
Sm	6.63	0.40	ppm	B, C
Eu	1.43	0.13	ppm	B, C
Gd	5.68	0.34	ppm	B, C
Tb	0.87	0.06	ppm	B, C
Dy	5.20	0.19	ppm	B, C
Ho	1.07	0.03	ppm	B
Er	3.01	0.20	ppm	B, C
Tm	0.44	0.04	ppm	B, C
Yb	2.96	0.06	ppm	B
Lu	0.45	0.02	ppm	B
Hf	7.91	0.23	ppm	B
Ta	1.58	0.08	ppm	B, C
W	3.85	0.29	ppm	B
Tl	1.14	0.10	ppm	B, C
Pb	21.6	2.3	ppm	B, C
Bi	0.14	0.01	ppm	C
Th	21.9	0.7	ppm	B, C
U	6.69	0.12	ppm	B

*The original manufacturer (OREAS) is not liable for any issues occurring from the use of this material since they took no part in the manufacturing of the pellets.

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The assigned values are the present best estimates of the true content for each element in the original powder. They are based on the evaluation and combination of the respective certified values given for different analytical methods in the original certificate of analysis and represent the mean of means.

The uncertainty is based on the standard error between the method specific values given in the original certificate as well as each respective method specific confidence interval at the 95 % level. If a value, originates from only one method the original 95 % confidence interval is reported as its uncertainty.

Detailed information and background data can be found in the original certificate of analysis and corresponding data package issued by OREAS.

Pellet serial number:	**{SERIENNUMMER}**
Manufactured for:	**{METHODE}**
Size:	**{GROESSE}**

Date of dispatch: {LIEFERDATUM}

Calculation Example:

Original OREAS Mean Values for Aluminium (Al):

Borate Fusion XRF	8.02 g/100 g	0.03 g/100 g CL @ 95 %
Peroxide / Borate Fusion ICP	7.81 g/100 g	0.08 g/100 g CL @ 95 %
Four acid digestion	8.02 g/100 g	0.47 g/100 g CL @ 95 %

Mean of Means	7.95 g/100 g
Standard Error	0.07 g/100 g

Error Propagation Final Uncertainty $\sqrt{0.07^2 + 0.03^2 + 0.08^2 + 0.47^2} = 0.48$ (1)

Final Value	7.95 g/100 g
Uncertainty	0.48 g/100 g

List of analytical methods used for calculation of the mean of means:

A Lithium borate fusion for full suite elemental package by X-ray fluorescence
B Lithium borate or sodium peroxide fusion with full suite elemental package by ICP-OES and/or ICP-MS finish
C Low level 4-acid digestion for full suite elemental package by ICP-OES and/or ICP-MS finish
D Infrared combustion furnace

Please note that only full to nearly full dissolution methods were considered in the calculation. An example of nearly full dissolution would be a so-called four acid digestion, which is capable of dissolving most minerals, but not all. The methods considered are given for each analyte, the nearly full dissolution methods, e.g. the four acid digestion, were only included into the calculation of the final value when in statistical agreement with the full dissolution values.

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Intended Use

This microanalytical reference material (MRM) is designed for use by laboratories undertaking the determination of major and trace element mass fractions in granodiorite and equivalent matrices with LA-ICP-MS (Laser Ablation Inductively Coupled Plasma Mass Spectrometry), µXRF/XRF (Micro X-ray Fluorescence Spectroscopy) and LIBS (Laser-Induced Breakdown Spectroscopy). It is suitable for calibration and as a secondary reference material for the assessment of a measurement procedure and quality control. Note that the material may only be used for a single purpose in the same measurement process. For example, it must not be used for calibration and method validation at the same time.

Description of the MRM

This MRM is a nanoparticular pressed powder pellet of the granodiorite powder "OREAS-20a". The original powder, purchased from the Ore Research & Exploration Pty. Ltd. (OREAS), was subjected to our own material-specific milling protocol, and pressed without any binders using a programmable hydraulic press. The fortification of contrasting colour surrounding the reference material is, according to the manufacturer, an "organic compound". The exact composition is not specified any closer. The certificate of analysis is available on demand.

Handling advice and Storage

Avoid touching the pellet's surface directly in order to prevent contamination. Also, do not clean the surface with any liquids as it may compromise the pellet's integrity.
Please note the label marks the bottom of the pellet.
If using a pressed pellet not ordered specifically for µXRF and or XRF please consider the sample thickness.
Store the MRM in a desiccator and or in a dark and dry environment.

The myStandards GmbH cannot be held responsible for changes that happen during storage of the material at the customer’s premises, especially with respect to opened samples.

Period of Validity

Provided the storage and handling conditions are met, no chemical alteration is known to exist, and the assigned values will remain stable. Therefore, the product information and assigned values for this MRM are valid for one year from the date of dispatch. This validity may be extended as further evidence of stability becomes available. The manufacturer will inform the customer if any alterations occur.

Safety instructions

Nano-particulate powders can cause harm if ingested, inhaled or in contact with skin. In their pressed form however, they do not exhibit any dusting. If a pellet should accidently break, we advise wearing a dust mask during clean up.

Further Information

This MRM has been produced in accordance with the recommendations specified in ISO Guides 30 to 35. Due to processing a part of the sample material may be seen on the fortification, this does not reduce the performance of the MRM. Please refrain from using this part of the pellet.
The pellets are sold exclusively via the myStandards GmbH and authorised subcontractors.

Document History

Version	*Date*	*Changes applied*
1.0	07.12.2022	First publication
1.1	08.12.2022	Addition of a note on the calculation of values for nearly full dissolution methods.
2.0	24.04.2023	Adaptation to automatically fill in the date and individual pellet characteristics

References

Hamlyn C., CERTIFICATE OF ANALYSIS FOR Granodiorite lithogeochem / blank (Devonian Lysterfield granodiorite complex, Melbourne Province of Australia) CERTIFIED REFERENCE MATERIAL OREAS 20a, Document: COA-1330-OREAS20a-R0, Ore Research & Exploration Pty. Ltd., 2018, available online at www.oreas.com

OREAS 20a DataPack-1.0.181002_164411.xlsx, Ore Research & Exploration Pty. Ltd., retrieved on 07.12.2022 from www.oreas.com/crm/oreas-20a/

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