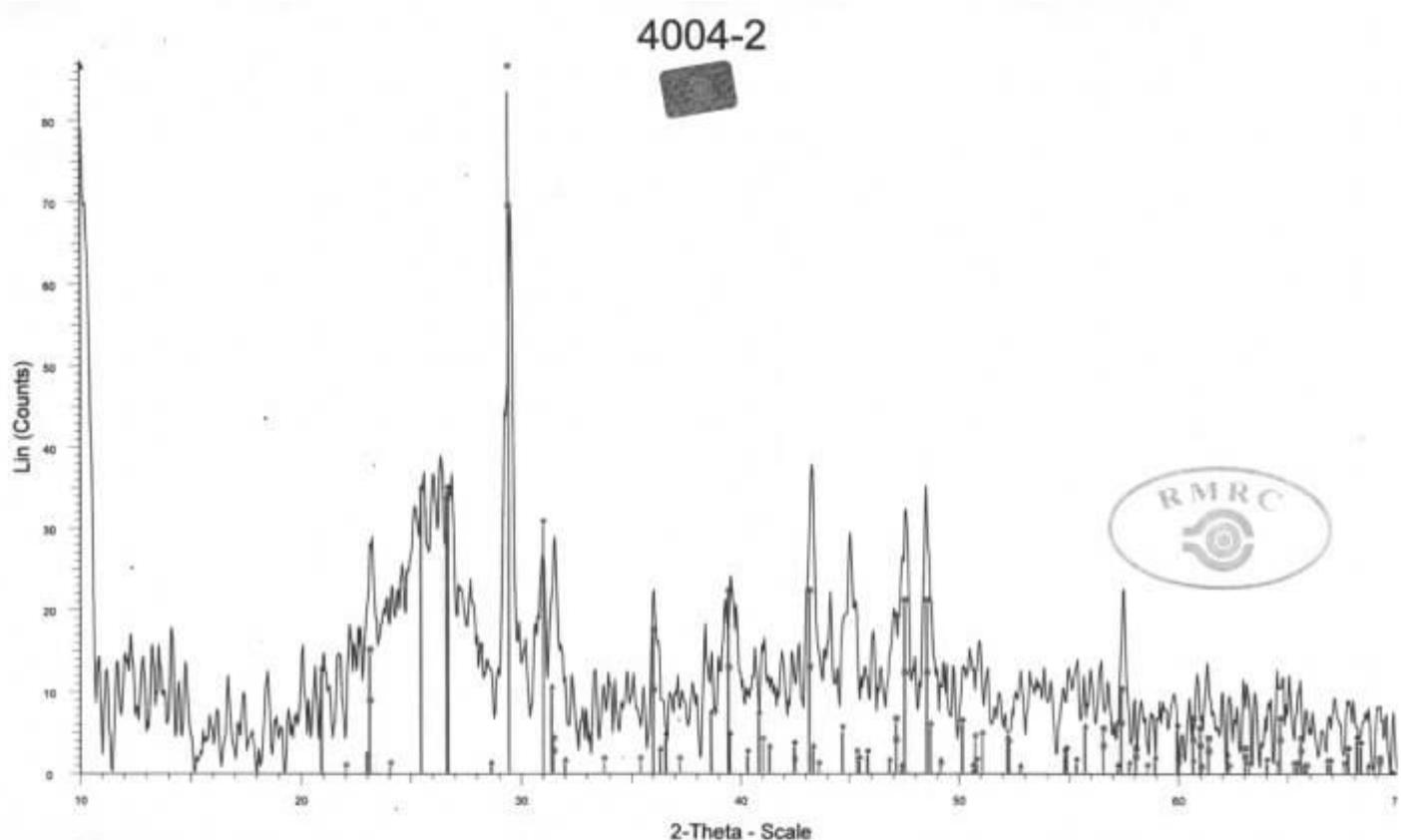


Technical specifications of Gilsonite

Gilsonite 90% (ash content 10%)



File: 4004-2.raw - Type: 2Th/Th locked - Start: 4.000 ° - End: 70.000 ° - Step: 0.050 ° - Step time: 2. s - Temp: 25 °C (Room) - Time Started: 0 s - 2-Theta: 4.000 ° - Theta: 2.000 ° - Phi: 0.00 ° - Aux1: 0.0 - Aux2: 0.0 - Aux3: 0.0 - Disk Operations: X_Offset 0.187 | Smooth 0.150 | Background 0.0000.500 | Import
005-0598 (") - Calcite, syn - CaCO₃ - Y: 100.00 % - d x by: 1. - WL: 1.54056 - Hexagonal (Rh) - a 4.88900 - b 4.96900 - c 17.06200 - alpha 90.000 - beta 90.000 - gamma 120.000 - Primitive - R-3c (167) - 8 - 367.780 - Mc PDF 2. - Mc
005-0598 ("') - Calcite, syn - CaCO₃ - Y: 56.99 % - d x by: 1. - WL: 1.54056 - Hexagonal (Rh) - a 4.98900 - b 4.98900 - c 17.06200 - alpha 90.000 - beta 90.000 - gamma 120.000 - Primitive - R-3c (167) - 8 - 367.780 - Mc PDF 2. - Mc
005-0490 (D) - Quartz, low - alpha-SiO₂ - Y: 28.50 % - d x by: 1. - WL: 1.54056 - Hexagonal - a 4.91300 - b 4.91300 - c 5.40500 - alpha 90.000 - beta 90.000 - gamma 120.000 - Primitive - P121 (152) - 3 - 112.985 - Mc PDF 3.6 - Mc
037-1496 ("') - Anhydrite, syn - CaSO₄ - Y: 28.50 % - d x by: 1. - WL: 1.54056 - Orthorhombic - a 6.99300 - b 7.09170 - c 6.24115 - alpha 90.000 - beta 90.000 - gamma 90.000 - Base-centered - BmmB (63) - 4 - 305.595 - Mc PDF 1. - Mc
005-0623 (D) - Dolomite - CaMg(CO₃)₂CaO-MgO-2CO₂ - Y: 25.00 % - d x by: 1. - WL: 1.54056 - Hexagonal (Rh) - a 4.83200 - b 4.83200 - c 15.93500 - alpha 90.000 - beta 90.000 - gamma 120.000 - Primitive - R-3 (148) - 1 - 322.3

RAZI METALLURGICAL RESEARCH CENTER

TEST REPORT

Customer Name:

Date Of Issue: 2020/5/30

Customer Address:

Order No: 2-4004

Sample Name: Gilsonite 90%

Revision No: 1

Client Reference Number:

Sample(s) Received at: 2020/5/13

Laboratory Environmental Conditions: Temperature: 24°C Moisture: 45% Attenuation:

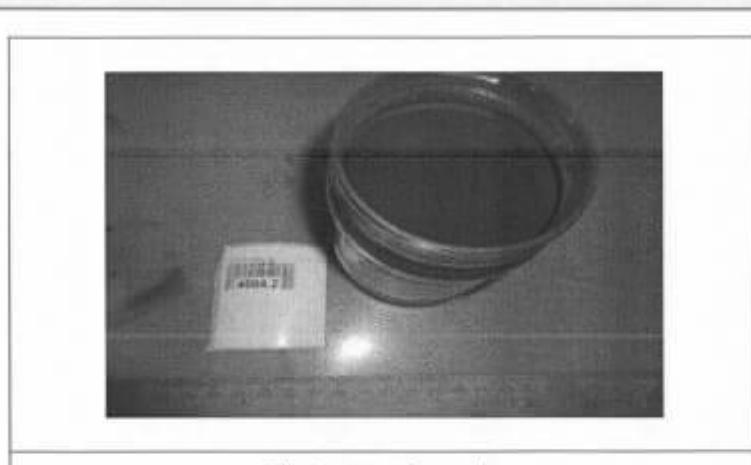
Date of Financial Verifying: 2020/5/16

Test was performed under the scope of ISO/IEC17025 standard.

Testing End Date: 2020/5/20

Sampling was done by the customer.

Page: 2 of 5



- Selected as premier laboratory by NTLN in 11 consecutive years
- Certified as research center by MIMT & MSRC
- Selected as premier research center by MIMT for 2015 to 2018
- Approved laboratory by ISIRL, MBBRI & LD
- Selected as premier laboratory by NTLN in 5 consecutive years

S. Sadrzadeh

Report will only be valid with **hologram**. RMRC has no responsibility to verify the sample's name stated by the customers. Test samples will be stored here only for **one month** after the tests. The above-mentioned results will be valid only for the tested samples. For further information please write to the Laboratory manager. For direct contact with the CEO please call (021) 4681 5533 or send email to y_jaferian@razi-center.net. Address: No. 8, Feman St., HajGhasem Aghari Blvd., Shahre Ghodr Entrance, 21st Km, Karaj Makhossa Rd., Tehran, Iran. Tel: (+98)(21) 6307 Fax: (+98)(21) 46831597 - 46843371 Customer Voice: (+98)(21) 46831568 ☎ : (+98)(912) 7990870 Website: www.razi-center.net Email: info@razi-center.net

Khaleghi
Technical Manager
M.Jaferian
Laboratory Manager

RAZI METALLURGICAL RESEARCH CENTER

TEST REPORT

Customer Name:

Date Of Issue: 2020/5/30

Customer Address:

Order No: 2-4004

Sample Name: gisoune-90%

Revision No.: 1

Client Reference Number:

Laboratory Environmental Conditions: Temperature: 25°C Moisture: 30% Attachments:
Sampling was done by the customer.

Sample(s) Received at: 2020/5/13

Date of Financial Verifying: 2020/5/16

Testing End Date: 2020/5/19

Page: 3 of 3

Soluble Material in Toluene

According to: ASTM D 5546

Result

- Soluble material in toluene is 84.3%.

Note

- Standard ASTM D 5546 is withdrawn and there isn't any replacement for that.



- Selected as premier laboratory by NTLN in 11 consecutive years
- Certified as research center by MIMT & MSRT
- Selected as premier research center by MIMT for 2015 to 2018
- Approved laboratory by ESIRI, NMRI & ED
- Selected as premier laboratory by HILN in 5 consecutive years

Export
Mobarrez

Mobarrez
Laboratory Manager

M.Jaferian
Laboratory Manager

Report will only be valid with **hologram**. RMRC has no responsibility to verify the sample's name stated by the customers. Test samples will be stored here only for **one month** after the tests.

The above-mentioned results will be valid only for the tested samples. For further information please write to the Laboratory manager. For direct contact with the CEO please call (021) 4681 5533 or send email to y_jaferian@razi-center.net. Address: No. 8, Feman St., HajGhasem Aghari Blvd., Shahre Ghodr Entrance, 21st Km, Karaj Makhossa Rd., Tehran, Iran. Tel: (+98)(21) 6307 Fax: (+98)(21) 46831597 - 46843371 Customer Voice: (+98)(21) 46831568 ☎ : (+98)(912) 7990870 Website: www.razi-center.net Email: info@razi-center.net

RAZI METALLURGICAL RESEARCH CENTER

TEST REPORT

Customer Name:

Date Of Issue: 2020/5/30

Customer Address:

Order No: 2-4004

Sample Name: gisoune-90%

Revision No.: 1

Client Reference Number:

Laboratory Environmental Conditions: Temperature: 25°C Moisture: 30% Attachments:

Sample(s) Received at: 2020/5/13

Date of Financial Verifying: 2020/5/16

Testing End Date: 2020/5/19

Test was performed under the scope of ISO/IEC17025 standard.

Sampling was done by the customer.

Page: 4 of 5

Coal & Graphite Analysis**Results**

- Result of chemical analysis test:

| Test Name | Test Reference Standard | Test Result (%) |
|-----------------|-------------------------|-----------------|
| C (fixed C)* | ASTM D 3172-13 | 28.0 |
| Ash | ASTM D3174-1B | 10.7 |
| Volatile Matter | INSO 11098-1390 | 61.3 |
| moisture* | ASTM D 3173-17 | 1.3 |

*These tests are not under the scope of ISO/IEC-17025 standard.

Notes

- The test report depends on sampling and uniformity of sample.

- Selected as premier laboratory by NTLN in 11 consecutive years
- Certified as research center by MIMT & MSRT
- Selected as premier research center by MIMT for 2015 to 2018
- Approved laboratory by ESIRI, NMRI & ED
- Selected as premier laboratory by HILN in 5 consecutive years



- These tests were done on dry sample.

Expert
Habibzadeh
Habibzadeh

M.Jaferian
Laboratory Manager

Report will only be valid with hologram. RMRC has no responsibility to verify the sample's name stated by the customer. Test samples will be stored here only for one month after the tests.

The above-mentioned results will be valid only for the tested samples. For further information please write to the Laboratory manager. For direct contact with the CEO please call

(021) 4681 5533 or send email to y_jalilian@razi-center.net Address: No. 8, Ferman St., HajGhasem Asghari Blvd., Shahr-e-Gholab Entomie, 21st Km, Karg-e-Makhtous Rd., Tehran, Iran.

Tel: (+98)(21) 6307 Fax: (+98)(21) 46831597 - 46843371 Customer Voice: (+98)(21) 46831568 : (+98)(912) 7990870 Website: www.razi-center.net Email: info@razi-center.net

RAZI METALLURGICAL RESEARCH CENTER

TEST REPORT

Customer Name:

Customer Address:

Sample Name: gilsonite-90%

Client Reference Number: Laboratory Environmental Conditions: Temperature: 24°C Moisture: 45% Attachments:

Test was performed under the scope of ISO/IEC17025 standard. Sampling was done by the customer.

Date Of Issue: 2020/5/30
Order No: 2-4004
Revision No.: 1
Sample(s) Received at: 2020/5/13
Testing End Date: 2020/5/16
Test(s) Finished at: 2020/5/20
Page: 5 of 5

Chemical Analysis, XRD

According to: BS EN 13925-1: 2008



Preparation of sample: No grinded grinded
Current: 30 mA Voltage: 40 kV Anode: Cu
2θ: 4-70° Step Size: 0.05 Counting time: 0.5 sec

Result of chemical compound, XRD:

1. Amorphous Phase
2. Calcite CaCO₃
3. Anhydrite CaSO₄
4. Dolomite CaMg(CO₃)₂
5. Carbon Phase C
6. Quartz SiO₂

Notes

- The analyzing was done after burning the sample at 600°C.
- XRD graph is attached.
- The analysis depends on sampling and uniformity of sample.

- Selected as premier laboratory by IITNL in 11 consecutive years
- Certified as research center by MIMT & MSRI
- Selected as premier research center by MIMT for 2019 to 2018
- Approved laboratory by ISIRI, NMEME & ED
- Selected as premier laboratory by IITNL in 5 consecutive years

S. Sattaree

Khalilzadeh
Technical Manager

M.Jaferian
Laboratory Manager

Report will only be valid with hologram. RMRC has no responsibility to verify the sample's name stated by the customer. Test samples will be stored here only for one month after the tests.

The above-mentioned results will be valid only for the tested samples. For further information please write to the Laboratory manager. For direct contact with the CEO please call

(021) 4681 5533 or send email to y_jalilian@razi-center.net Address: No. 8, Ferman St., HajGhasem Asghari Blvd., Shahr-e-Gholab Entomie, 21st Km, Karg-e-Makhtous Rd., Tehran, Iran.

Tel: (+98)(21) 6307 Fax: (+98)(21) 46831597 - 46843371 Customer Voice: (+98)(21) 46831568 : (+98)(912) 7990870 Website: www.razi-center.net Email: info@razi-center.net

Gilsonite 85% (ash content 15%)

RAZI METALLURGICAL RESEARCH CENTER

TEST REPORT

Customer Name:

Customer Address:

Sample Name: gilsonite-85%

Client Reference Number: Laboratory Environmental Conditions: Temperature: 24°C Moisture: 45% Attachments:

Test was performed under the scope of ISO/IEC17025 standard. Sampling was done by the customer.

Date Of Issue: 2020/5/30
Order No: 2-4004
Revision No.: 1
Sample(s) Received at: 2020/5/13
Date of Financial Verifying: 2020/5/16
Testing End Date: 2020/5/20
Page: 1 of 5

Chemical Analysis, XRF

According to: ASTM E 1621-13

Preparation of sample: No grinded grinded

- Selected as premier laboratory by IITNL in 11 consecutive years

RESULT OF XRF:

| Oxide | Weight % | Oxide | Weight % | Oxide | Weight % | Oxide | Weight % |
|-------------------------------|----------|--------------------------------|----------|--------------------------------|----------|------------------|----------|
| Na ₂ O | 2.6 | MgO | 1.2 | Al ₂ O ₃ | 6.7 | SiO ₂ | 18.34 |
| P ₂ O ₅ | 0.33 | SO ₃ | 24.4 | Cl | 0.17 | K ₂ O | 1.0 |
| CaO | 33.6 | Fe ₂ O ₃ | 4.7 | NiO | 0.26 | SrO | 0.13 |
| L.O.I | 6.57 | - | - | - | - | - | - |

Notes:

- The analyzing was done after burning the sample at 600°C.
- The analysis depends on sampling and uniformity of sample.
- The result is semi quantitative.
- Because of L.O.I determination, the test sample was kept at 950°C for 1.5 hour.

- Certified as research center by MIMT & MSRT
- Selected as premier research center by MIMT for 2015 to 2018
- Approved laboratory by ISIRI, MHME & ED
- Selected as premier laboratory by BNILN in 5 consecutive years

S. Sahrree

Khalili
Technical Manager

Report will only be valid with hologram. RMRC has no responsibility to verify the sample's name stated by the customers. Test samples will be stored here only for one month after the tests.

The above-mentioned results will be valid only for the tested samples. For further information please write to the Laboratory manager. For direct contact with the CEO please call

(021) 4681 5533 or send email to y_jafarian@razi-center.net Address: No. 8, Ferman St., HajGhasem Asghari Blvd., Shahre Ghods Entrance, 21st Km, Karaj Makhsoos Rd., Tehran, Iran.

Tel: (+98)(21) 6307 Fax: (+98)(21) 46831597 - 46843371 Customer Voice: (+98)(21) 46831568

TEST REPORT

Customer Name:



Date Of Issue:

2020/5/30

Customer Address:

Order No:

1-4004

Sample Name: gibsonite-85%

Revision No.:

1

Client Reference Number:

Sample(s) Received at:

2020/5/13

Laboratory Environmental Conditions: Temperature : 24°C Moisture: 45% Attachments:

Date of Financial Verifying:

2020/5/16

Test was performed under the scope of ISO/IEC17025 standard.

Sampling was done by the customer.

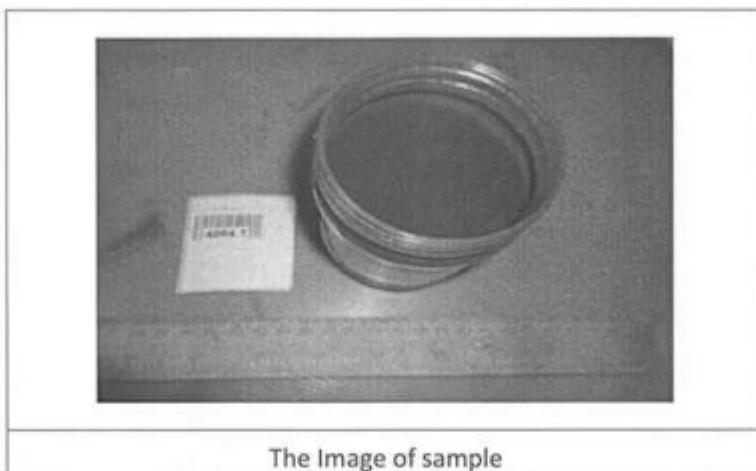
Testing End Date :

2020/5/20

Page:

2

of 5



The Image of sample



- Selected as premier laboratory by BNILN in 5 consecutive years

- Certified as research center by MIMT & MSRT

- Selected as premier research center by MIMT for 2015 to 2018

- Approved laboratory by ISIRI, MHME & ED

- Selected as premier laboratory by BNILN in 5 consecutive years

S. Sahrree

Khalili
Technical Manager

Report will only be valid with hologram. RMRC has no responsibility to verify the sample's name stated by the customers. Test samples will be stored here only for one month after the tests.

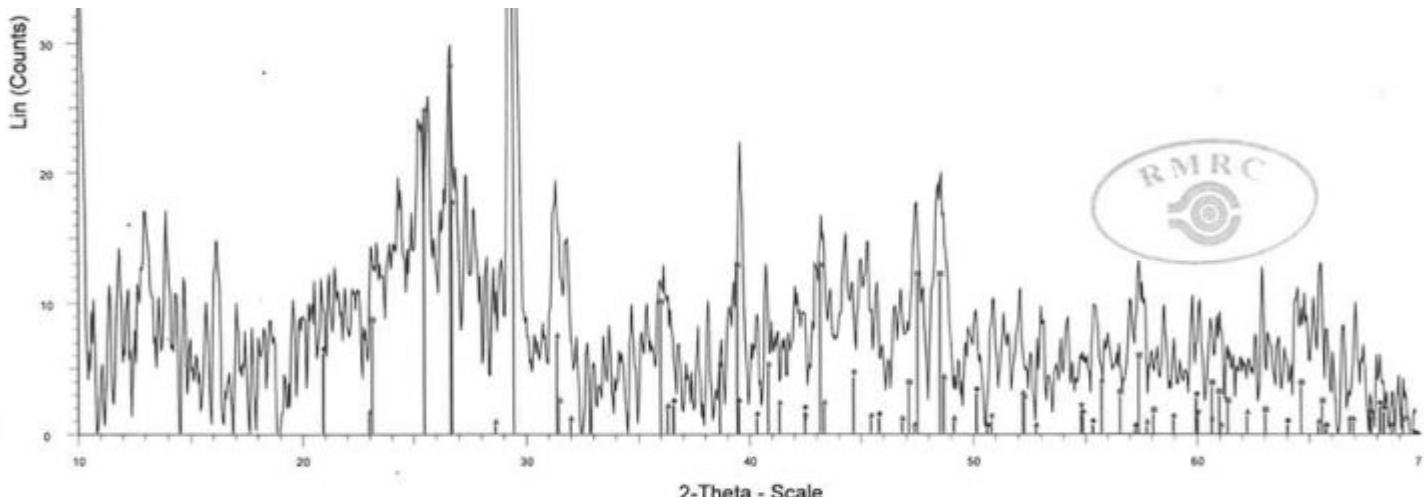
The above-mentioned results will be valid only for the tested samples. For further information please write to the Laboratory manager. For direct contact with the CEO please call

(021) 4681 5533 or send email to y_jafarian@razi-center.net Address: No. 8, Ferman St., HajGhasem Asghari Blvd., Shahre Ghods Entrance, 21st Km, Karaj Makhsoos Rd., Tehran, Iran.

Tel: (+98)(21) 6307 Fax: (+98)(21) 46831597 - 46843371 Customer Voice: (+98)(21) 46831568

4004-1





File: 4004-1.raw - Type: 2Th/Th locked - Start: 4.000 ° - End: 70.000 ° - Step: 0.050 ° - Step time: 2. s - Temp.: 25 °C (Room) - Time Started: 0 s - 2-Theta: 4.000 ° - Theta: 2.000 ° - Phi: 0.00 ° - Aux1: 0.0 - Aux2: 0.0 - Aux3: 0.0 - Dis. Operations: X Offset: -0.229 | Smooth: 0.150 | Background: 0.000, 0.500 | Import
 05-0586 (*) - Calcite, syn - CaCO₃ - Y: 100.00 % - d x by: 1 - WL: 1.54056 - Hexagonal (Rh) - a: 4.98900 - b: 4.98900 - c: 17.06200 - alpha: 90.000 - beta: 90.000 - gamma: 120.000 - Primitive - R-3c (167) - 6 - 367.780 - Icc PDF 2. - VI
 05-0490 (D) - Quartz, low - alpha-SiO₂ - Y: 25.00 % - d x by: 1 - WL: 1.54056 - Hexagonal - a: 4.91300 - b: 4.91300 - c: 5.40500 - alpha: 90.000 - beta: 90.000 - gamma: 120.000 - Primitive - P-3121 (152) - 3 - 112.985 - Icc PDF 3.6 - S-
 437-1496 (*) - Anhydrite, syn - CaSO₄ - Y: 35.42 % - d x by: 1 - WL: 1.54056 - Orthorhombic - a: 6.99330 - b: 7.00170 - c: 6.24110 - alpha: 90.000 - beta: 90.000 - gamma: 90.000 - Base-centred - Imm (63) - 4 - 305.595 - Icc PDF 1. -
 Y-25-0284 (D) - Graphite, syn - C - Y: 40.21 % - d x by: 1 - WL: 1.54056 - Hexagonal - a: 2.45600 - b: 2.45600 - c: 6.69600 - alpha: 90.000 - beta: 90.000 - gamma: 120.000 - Primitive - P-63/mmc (194) - 4 - 34.9786 - Icc PDF 1. - S-0.22.

RAZI METALLURGICAL RESEARCH CENTER

TEST REPORT

Customer Name: [REDACTED]
 Customer Address:
 Sample Name: gilsonite-85%

Client Reference Number: Laboratory Environmental Conditions: Temperature: 25°C Moisture: 30% Attachments:
 Test was performed under the scope of ISO/IEC17025 standard. Sampling was done by the customer.

Date Of Issue: 2020/5/30
 Order No: 1-4004
 Revision No.: 1
 Sample(s) Received at: 2020/5/13
 Date of Financial Verifying: 2020/5/16
 Testing End Date: 2020/5/19
 Page: 4 of 5

Coal & Graphite Analysis

Results

- Result of chemical analysis test:

| Test Name | Test Reference Standard | Test Result (%) |
|-----------------|-------------------------|-----------------|
| C (fixed C)* | ASTM D 3172-13 | 27.5 |
| Ash | ASTM D3174-18 | 14.3 |
| Volatile Matter | INSO 11098-1390 | 58.2 |
| moisture* | ASTM D 3173(17) | 1.4 |

*These tests are not under the scope of ISO/IEC-17025 standard

Notes

- The test report depends on sampling and uniformity of sample.
- These tests were done on dry sample.



- Selected as premier laboratory by NTLN in 11 consecutive years
- Certified as research center by MIMT & MSRT
- Selected as premier research center by MIMT for 2015 to 2018
- Approved laboratory by ISIRI, MHME & ESD
- Selected as premier laboratory by HTLN in 5 consecutive years.

Expert
Moharrerz

Moharrerz
Signature

Laboratory Manager
Y. Jafarian

Report will only be valid with hologram. RMRC has no responsibility to verify the sample's name stated by the customers. Test samples will be stored here only for one month after the tests. The above-mentioned results will be valid only for the tested samples. For further information please write to the Laboratory manager. For direct contact with the CEO please call (021) 4681 5533 or send email to y_jafarian@razi-center.net. Address: No. 8, Ferman St., HajGhasem Aghari Blvd., Shahre Ghods Entrance, 21st Km, Karaj Malhousi Rd., Tehran, Iran.

Tel: (+98)(21) 6307 Fax: (+98)(21) 46831597 - 46843371 Customer Voice: (+98)(21)-46831568 ☎ ☎ : (+98)(912) 7990870 Website: www.razi-center.net Email: info@razi-center.net

RAZI METALLURGICAL RESEARCH CENTER

TEST REPORT

Customer Name: [REDACTED]
 Customer Address:
 Sample Name: gilsonite-85%

Client Reference Number: Laboratory Environmental Conditions: Temperature: 24°C Moisture: 45% Attachments:
 Test was performed under the scope of ISO/IEC17025 standard. Sampling was done by the customer.

Date Of Issue: 2020/5/30
 Order No: 1-4004
 Revision No:
 Sample(s) Received at: 2020/5/13
 Testing End Date: 2020/5/16
 Test(s) Finished at: 2020/5/20
 Page: 5 of 5

Chemical Analysis, XRD

According to: BS EN 13925-1: 2008



Preparation of sample: No grinded grinded
 Current : 30 mA Voltage : 40 kV Anode : Cu
 2θ : 4-70° Step Size: 0.05 Counting time: 0.5 sec

Result of chemical compound, XRD:

- | | |
|--------------------|--------------------|
| 1. Amorphous Phase | |
| 2. Calcite | <chem>CaCO3</chem> |
| 3. Anhydrite | <chem>CaSO4</chem> |
| 4. Carbon Phase | C |
| 5. Quartz | <chem>SiO2</chem> |

Notes

The analyzing was done after burning the sample at 600°C.

XRD graph is attached.

The analysis depends on sampling and uniformity of sample.

- Selected as premier laboratory by NTLN in 11 consecutive years
- Certified as research center by MIMT & MSRT
- Selected as premier research center by MIMT for 2015 to 2018
- Approved laboratory by ISIRI, MIAME & EID
- Selected as premier laboratory by IHTLN in 5 consecutive years

Kherlili
Technical Manager

Report will only be valid with hologram. RMRC has no responsibility to verify the sample's name stated by the customers. Test samples will be stored here only for **one month** after the tests.

The above-mentioned results will be valid only for the tested samples. For further information please write to the Laboratory manager. For direct contact with the CEO please call

(021) 4681 5533 or send email to y_jafarian@razi-center.net Address: No. 8, Ferman St., HayGhasem Asghari Blvd., Shahre Ghods Entrance, 21th Km, Karaj Makhsoos Rd., Tehran, Iran.Tel: (+98)(21) 6307 Fax: (+98)(21) 46831597 - 46843371 Customer Voice: (+98)(21) 46831568 (+98)(912) 7990870 Website: www.razi-center.net Email: info@razi-center.net