



LOTi Co., Ltd.

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BROCHURE
Low Oxygen
High Flowability
Titanium Alloy Powder

LOTi Co., Ltd.

LOTi Co., Ltd. (Low Oxygen Titanium: LOTi) is a start-up company founded in January 2021 by a professor from Jeonbuk National University. **Our company specializes in deoxidation and surface modification technologies that improve the flowability of titanium alloy powder for additive manufacturing.** With our cutting-edge technology, we are able to reduce oxygen levels in the powder and enhance its reusability and requalification. This enables us to contribute to a more sustainable manufacturing process and reduce waste in the industry.

Company history

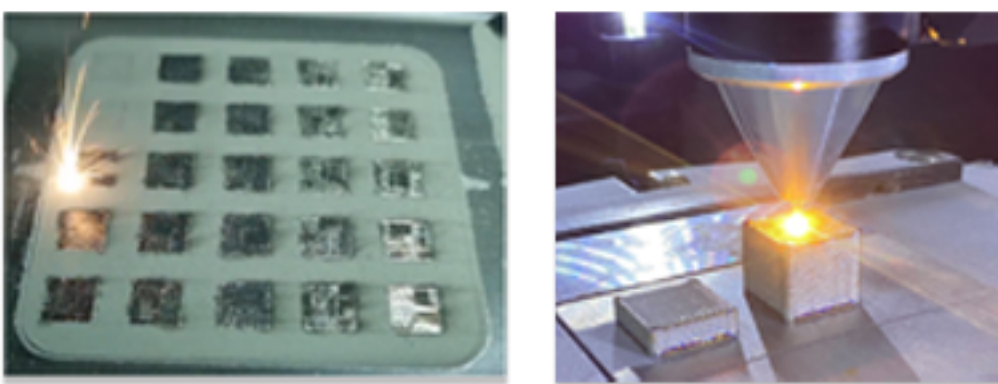
- 2021.01 Established as a start-up company
- 2021.07 Selected for the initial start-up package project by the Korea Institute of Startup and Entrepreneurship
- 2021.07 Chosen as a Tech Valley Company by the Korea Technology Finance Corporation
- 2021.11 Selected for the Business Start-up Growth Technology Development Project
- 2021.12 Signed the technology transfer agreement (Jeonbuk National University → LOTi Co., Ltd.)
- 2022.11 Headquarters relocation (Jeonbuk National University → JBTP Technoville)
- 2023.01 Registered our own factory for production (Technoville B, room 108/110)
- 2023.03 Acquired a certificate of Research and Development Center
- 2023.03 Joined the 3D Printing Research Organization
- 2023.03 Certified as a venture enterprise (Innovative growth type)
- 2023.03 Attracting investment linked to the Korea Technology Finance Corporation (1 million \$)



LOTi's remarkable technologies for deoxidation and surface modification

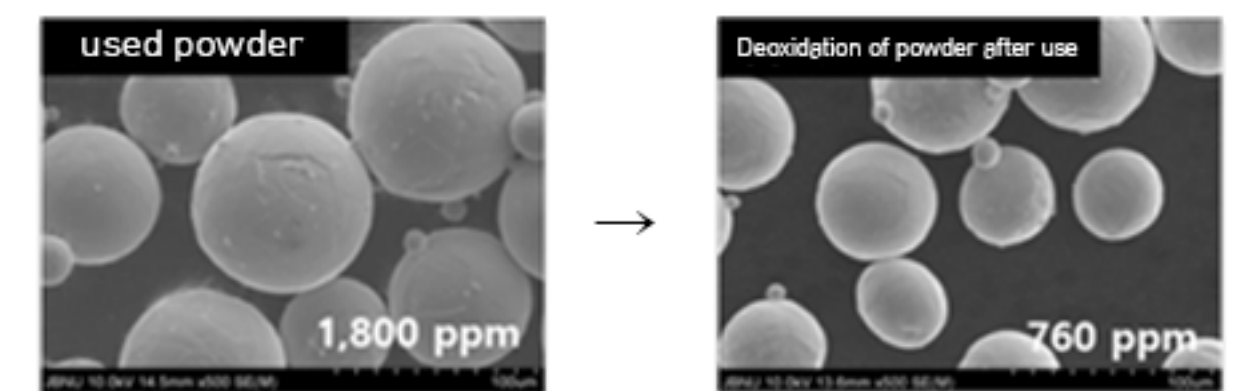
- Low Oxygen High Flowability(LOHF) Titanium alloy powder / Preoccupancy of new markets for reusability
- The company's expectation to product sales of more than 20 million \$ in 2027

- Product of LOHF components by Additive Manufacturing
- High density and high elongation components can be manufactured



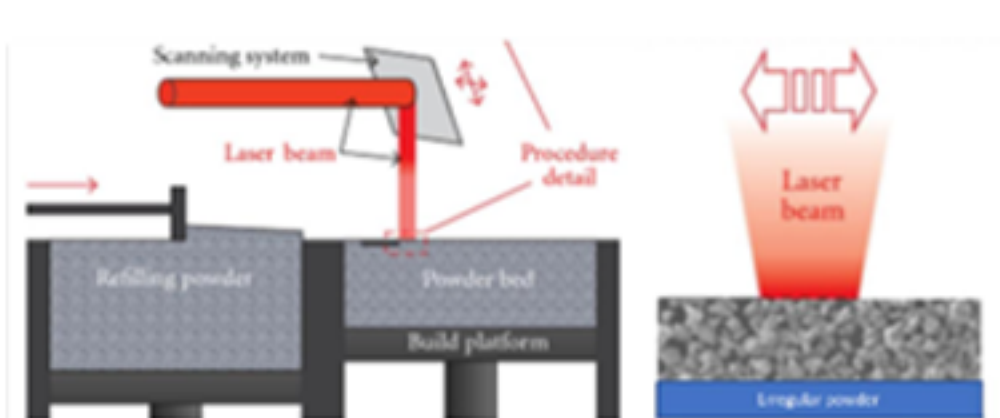
<3D printing for LOHF components>

- Deoxidation of the used powder after Additive Manufacturing
- New markets can be formed within 2-3 years

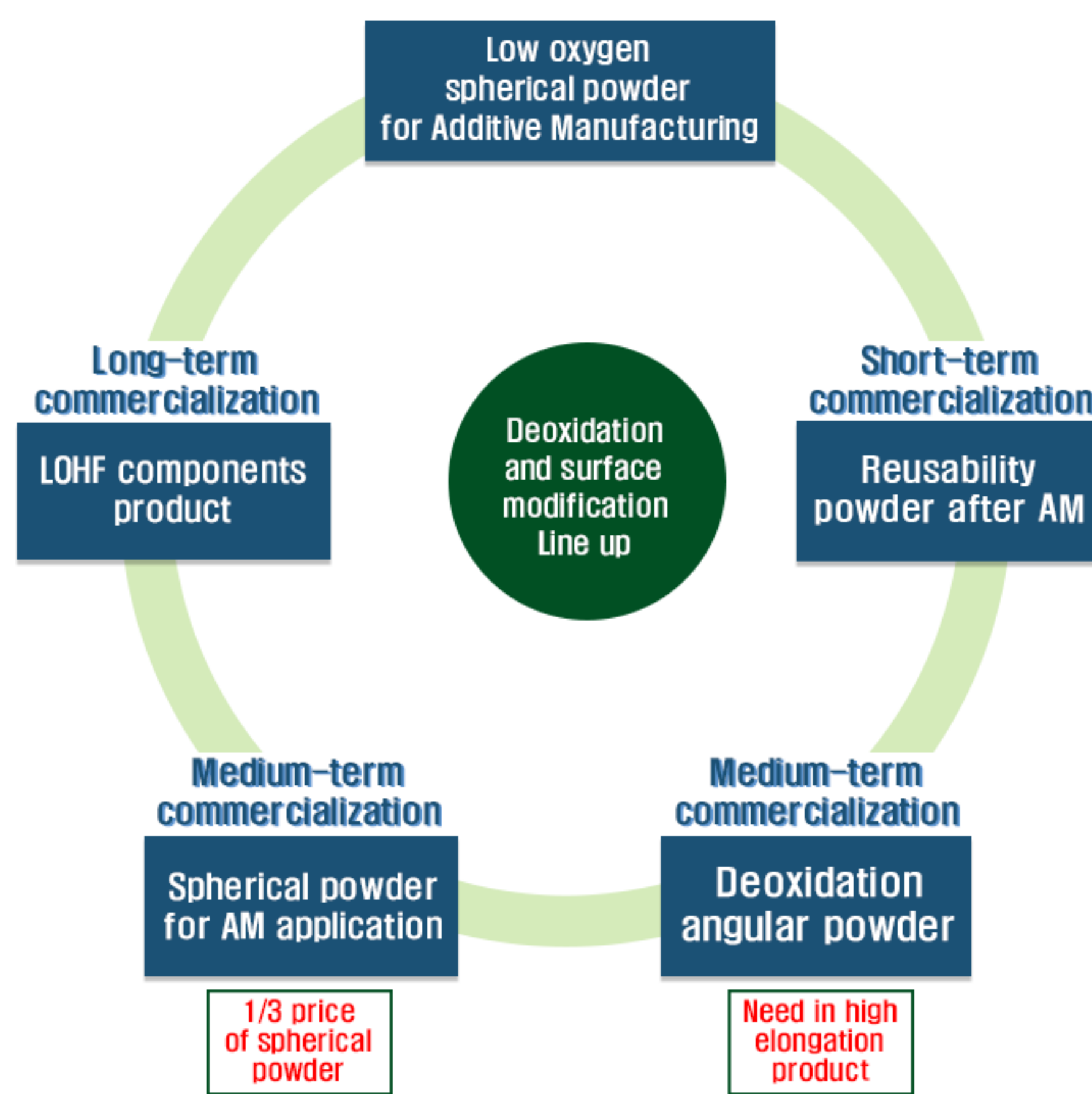


<Deoxidation of the used powder after AM>

- Substitution or mixed use of spherical powder
- Application of low oxygen high flowability angular powder



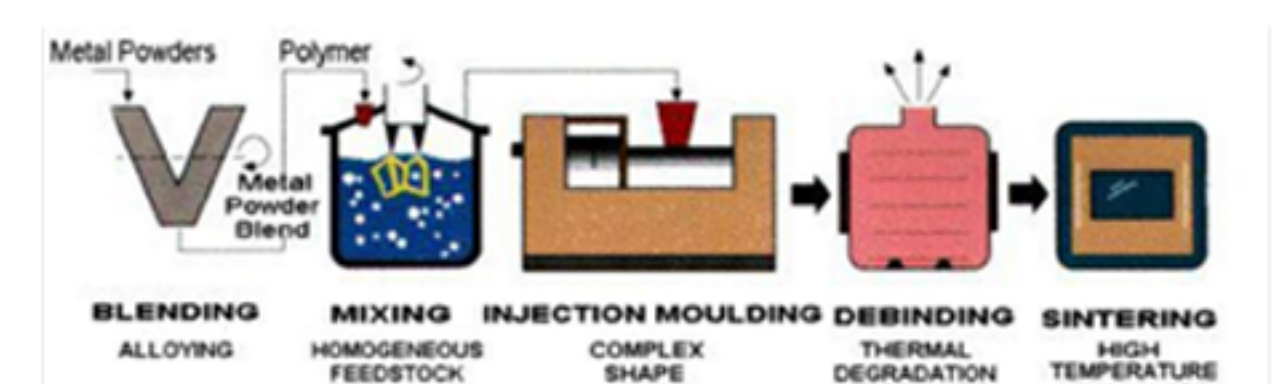
<Application for deoxidation angular powder>



1/3 price of spherical powder

Need in high elongation product

- Entering powder metallurgy market
- Application for low elongation product



<Powder metallurgy using LOHF angular powder>

Quality of LOHF titanium alloy powder for Additive Manufacturing

1. Oxygen content at the world's lowest level : Oxygen < 800ppm

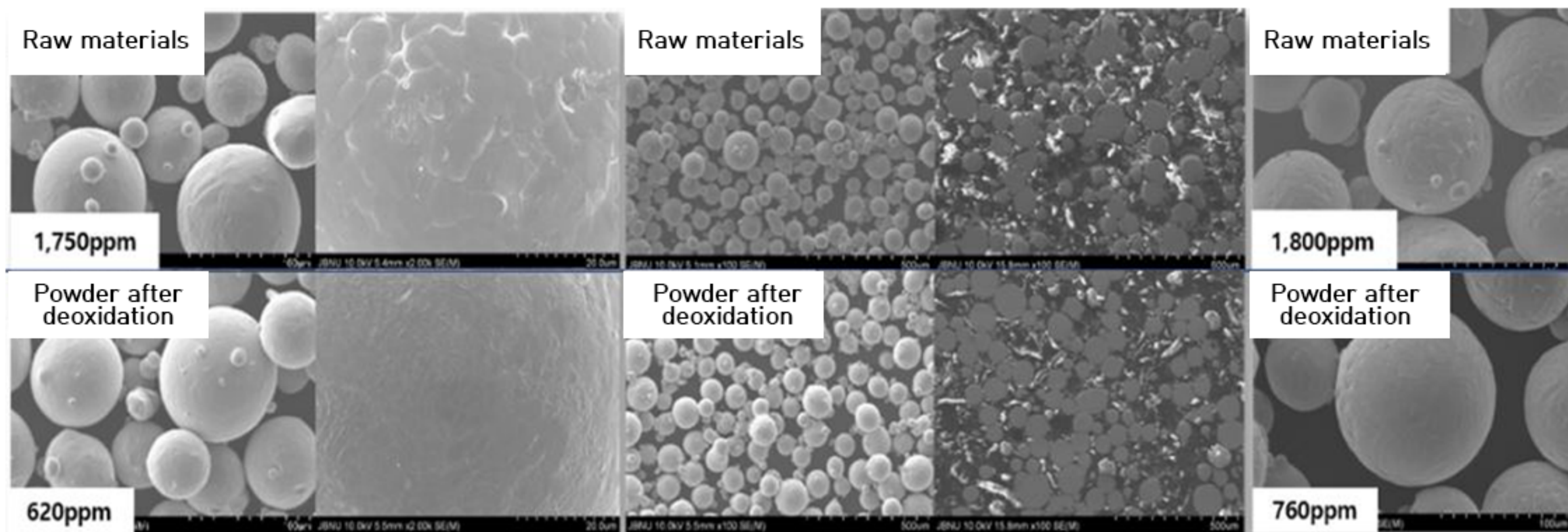
- Reduced surface oxide layer thicknesses and low oxygen content → Improved sintering density and elongation

2. The world's highest level of flowability : 26s/50g (ASTM B213 specification)

- Specialized powder for AM → Improved in powder flowability and spreadability

3. The world's only hydrophobic surface : Contact angle > 90°

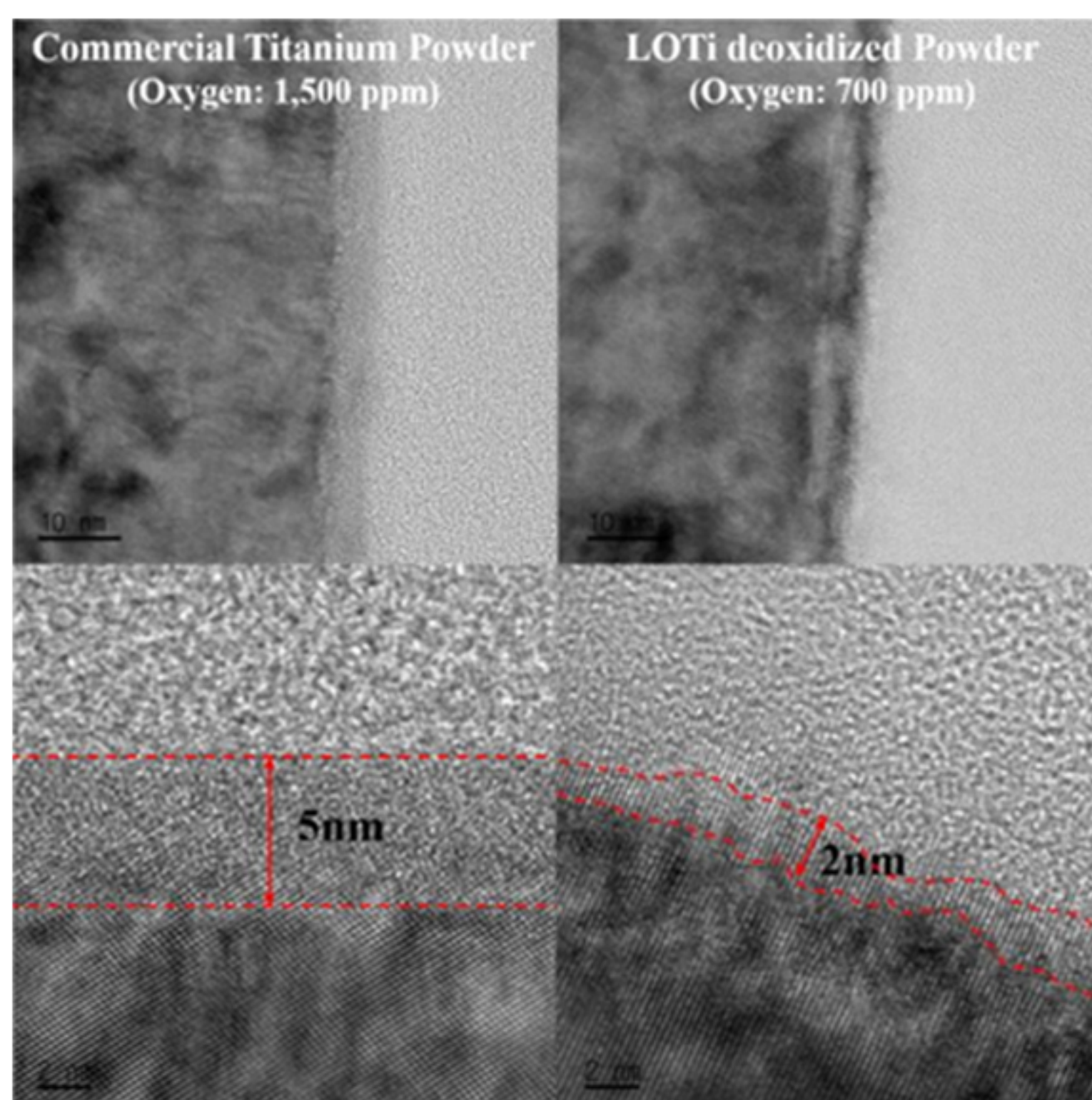
- Hydrophobic surface modification form hydrophilic surface
→ Highly oxidation resistance and ease to handle and store



Remarkable technologies for deoxidation and surface modification
→ Provides low oxygen high flowability titanium alloy powder for AM

Oxygen content at the world's lowest level : Oxygen < 800ppm

Reduced surface oxide layer thicknesses and low oxygen content
→ The resulting improvement in sintering density and elongation



Reduced oxide surface layer of the powder
↓
Easy to sinter powder

Reduced internal oxygen in the powder
↓
Improved in sintered properties

TEST REPORT

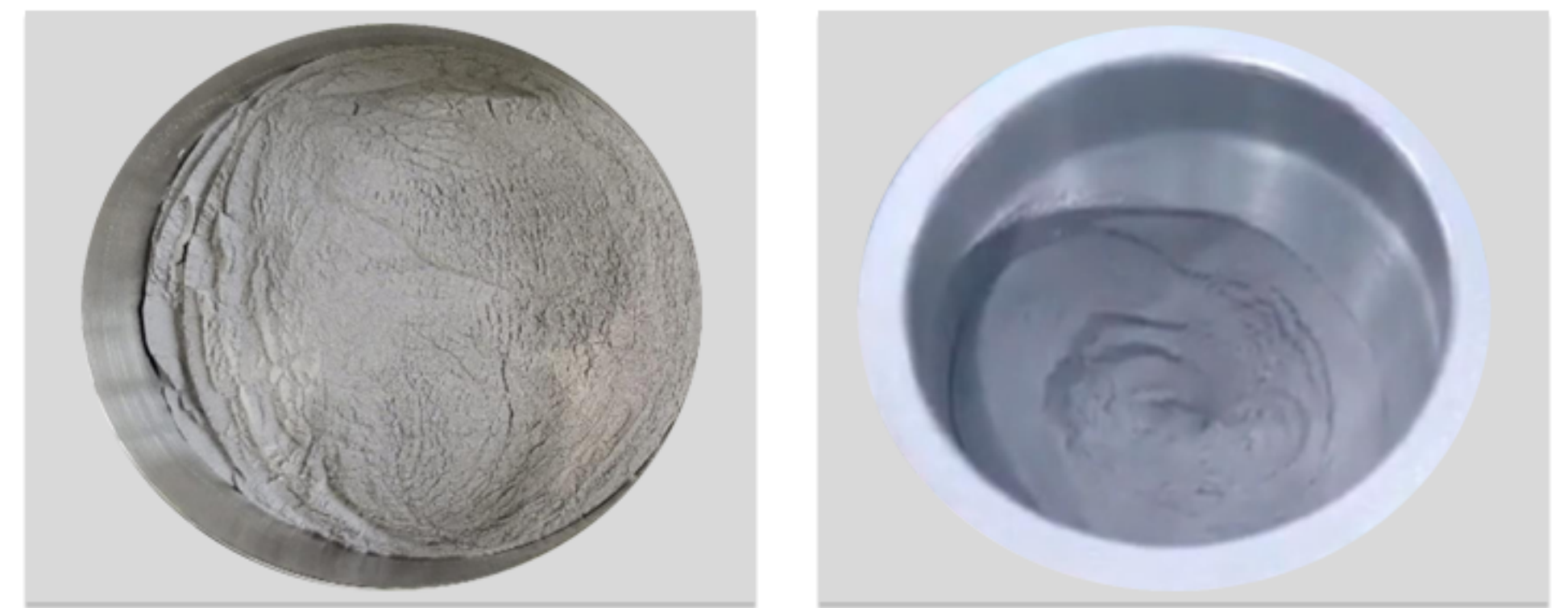
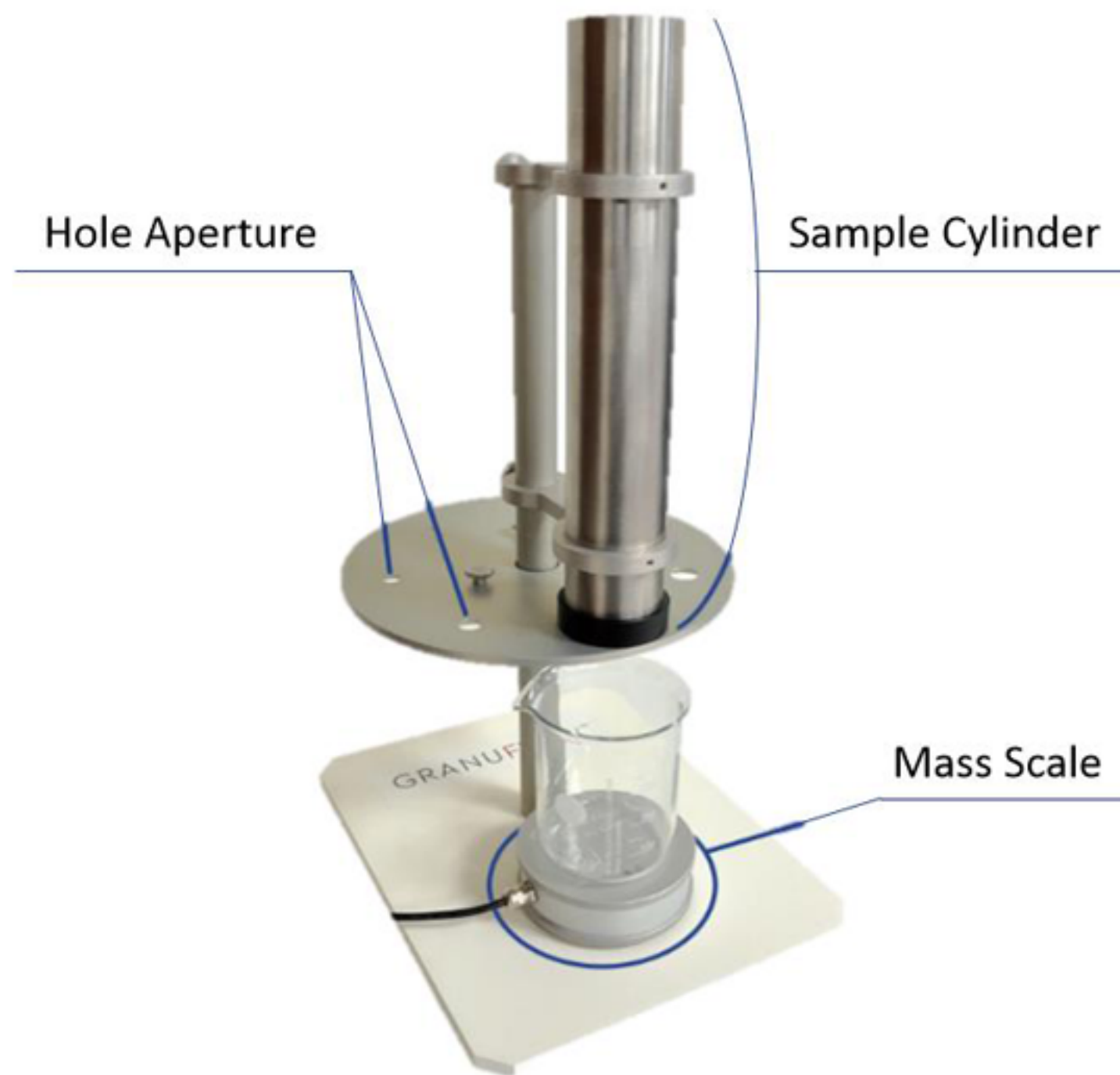
KOREATECH CRF Chungjeol-ro 1600, Dongnam-Gu, Cheonan-City, Chungnam Korea (Tel: +82 41 580 4880 Fax: +82 41 580 4896)		Report No.G2022-02653 Page (1) / (1) Page							
1. Client Name : LOTi Co., Ltd. Address : 567 Baekje-daero, Deokjin-gu, Jeonju-si, Jeollabuk-do									
2. Sample Description: Raw Ti-6Al-4V Powder, Deoxidized Ti-6Al-4V Powder									
3. Date of Test : 2022. 08. 05. (1 day)									
4. Test method used : Oxygen Nitrogen Analyzer									
5. Test Results : [Unit : ppm]									
<table border="1"> <thead> <tr> <th>Sample Name</th> <th>O</th> </tr> </thead> <tbody> <tr> <td>Raw Ti-6Al-4V Powder</td> <td>1290</td> </tr> <tr> <td>Deoxidized Ti-6Al-4V Powder</td> <td>710</td> </tr> </tbody> </table>		Sample Name	O	Raw Ti-6Al-4V Powder	1290	Deoxidized Ti-6Al-4V Powder	710		
Sample Name	O								
Raw Ti-6Al-4V Powder	1290								
Deoxidized Ti-6Al-4V Powder	710								
The results shown in this test report refer only to the sample(s) tested unless otherwise stated. When you need to verify the authenticity of the test report, please send the test report to the following address. - (Phone) +82 41 580 4880, (e-mail) emtc@koreatech.ac.kr									
Affirmation	Tested by Name: gyu-ha, Yum	Technical Manager Name: Yong-hyeon, PARK							
August-09, 2022.									
KOREATECH Center for Research and Facility									

Sample	Powder size (μm)	Oxygen (ppm)
Ti Gr.2 raw	15- 53	1290
Deoxidation	15 - 53	710

The world's highest level of flowability : 26s/50g (ASTM B213 specification)

Specialized powder for AM → Improved in powder flowability and spreadability

● Granuglow Instrument



<Powder appearance before surface modification>



<Powder appearance after surface modification>

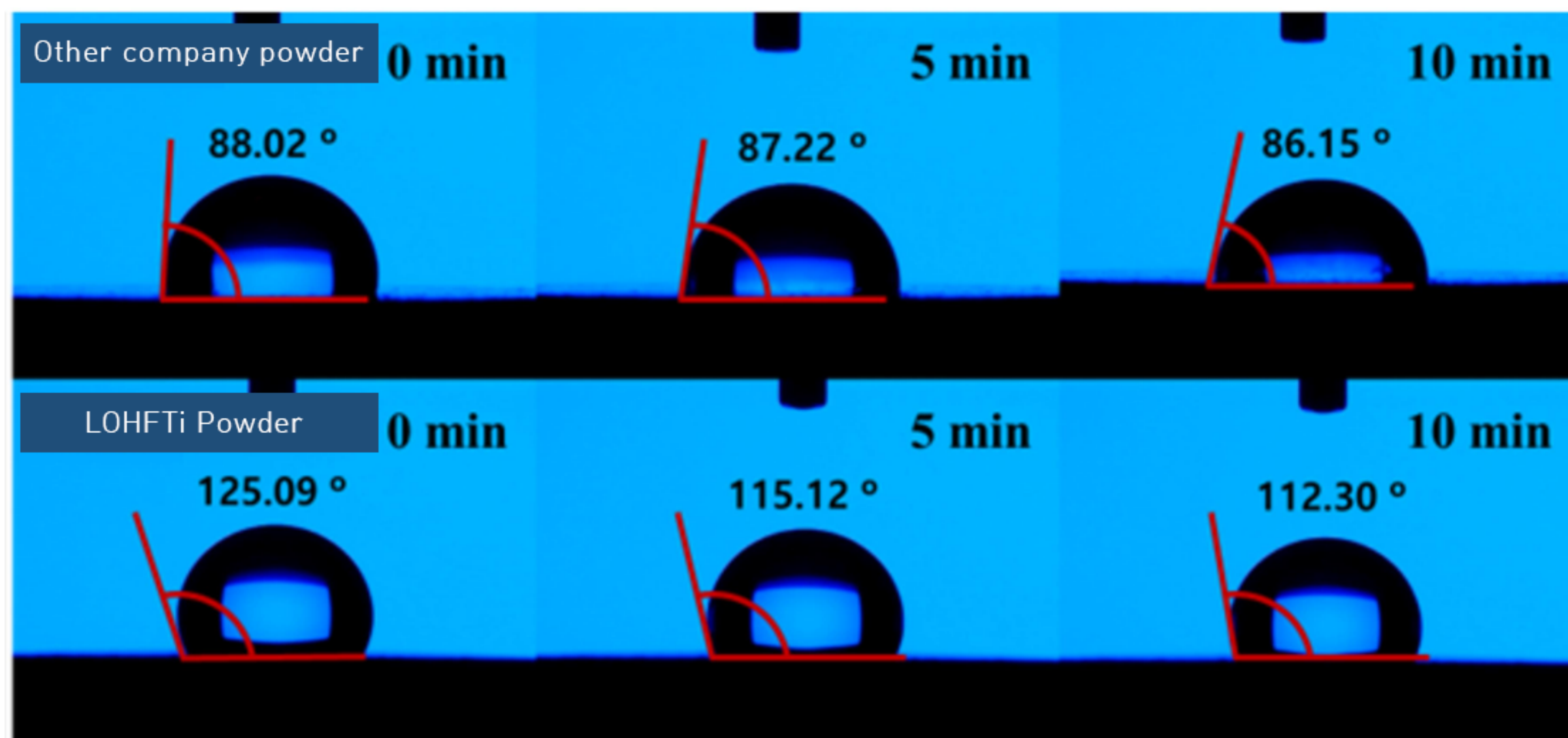
Aperture Size	2mm	2.5mm	4mm
Commercial Ti spherical powder	0.23 g/s	0.45 g/s	3.07 g/s
LOHF Ti spherical powder	0.65 g/s	1.15 g/s	4.74 g/s
Commercial Ti-6Al-4V spherical powder	0.34 g/s	0.40 g/s	3.07 g/s
LOHF Ti-6Al-4V spherical powder	0.77 g/s	1.34 g/s	4.31 g/s

Remarkable improvement in flowability after surface modification of raw material powder
 (Approximately 50% ~ 200% improvement over raw materials)

The world's only hydrophobic surface : Contact angle > 90°

Hydrophobic surface modification from hydrophilic surface

→ Excellent resistance to oxidation and is easy to handle and store

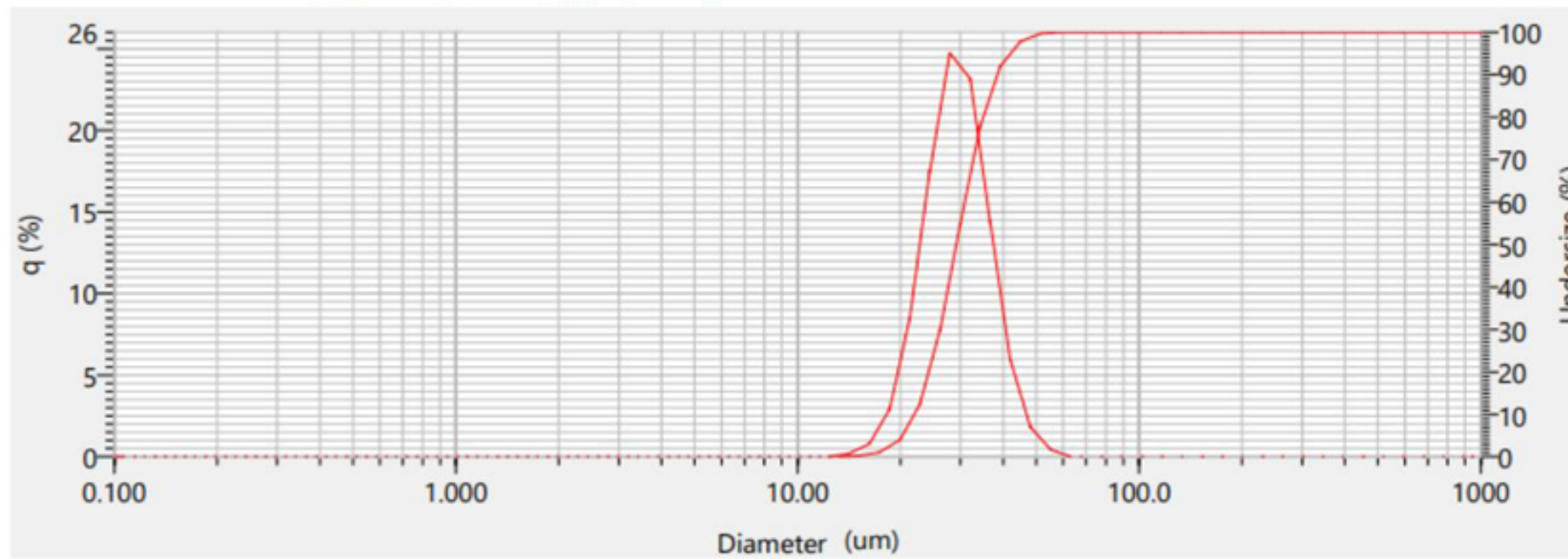


- Contact angle measurement on the compact of titanium powder
- Criteria for hydrophobic surface property : Contact angle > 90°
- Other powder : 88.02° (initial value) means hydrophilic surface
- LOHFTi powder : 125.09° (initial value) suggests hydrophobic surface

Particle size distribution of LOHF titanium alloy powder

● Example of particle size of 15~53 μm size Ti-6Al-4V powder

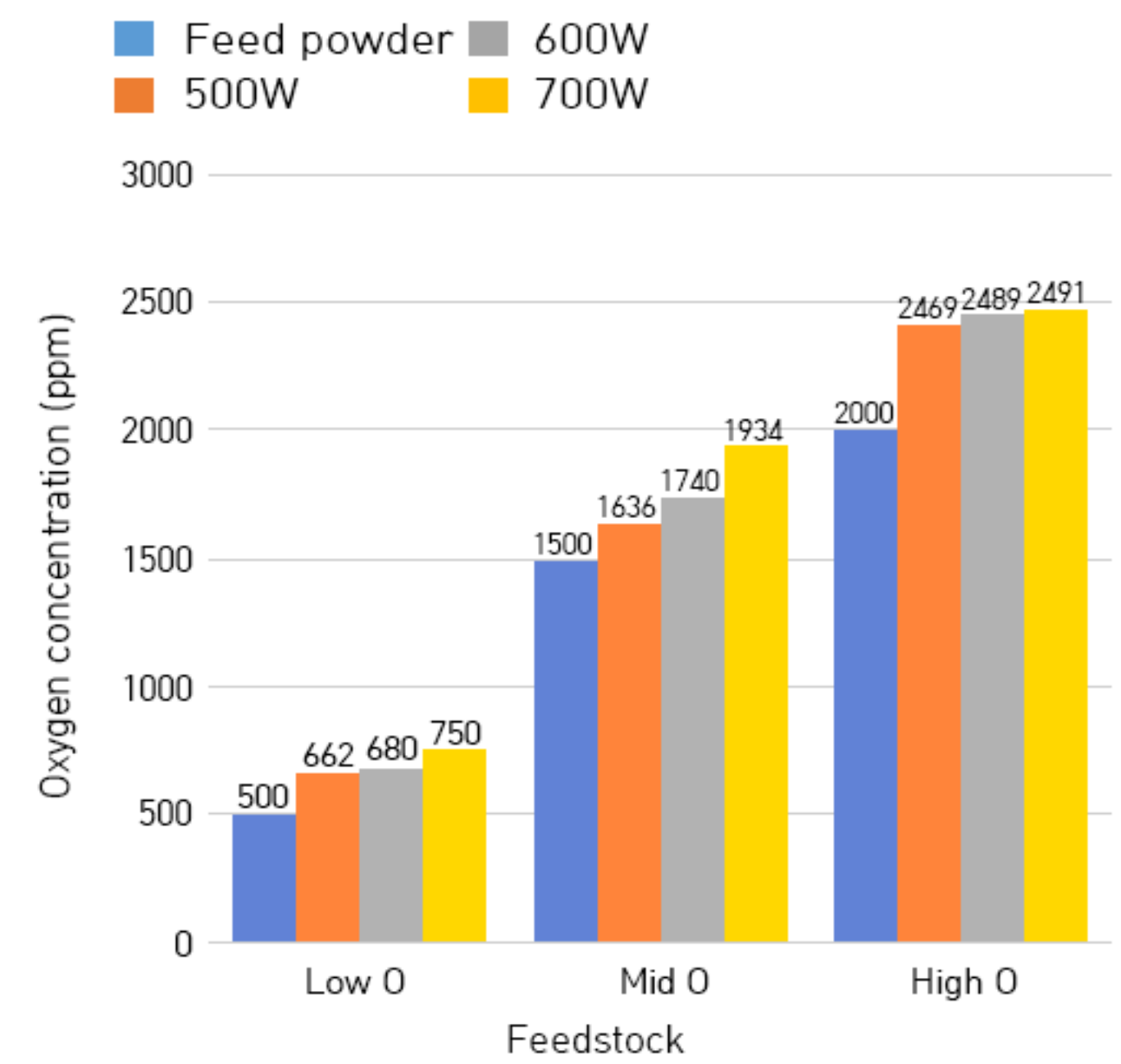
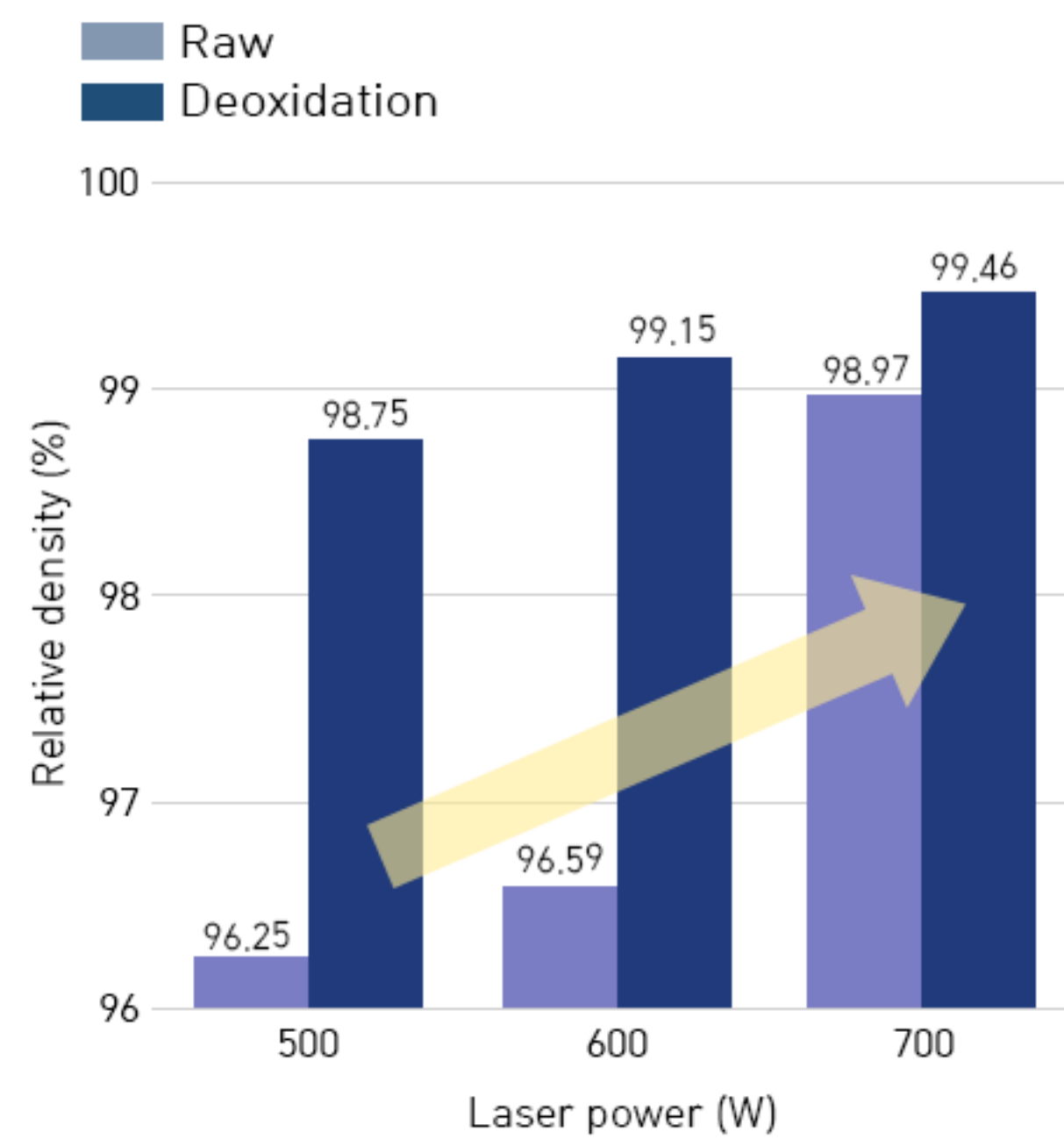
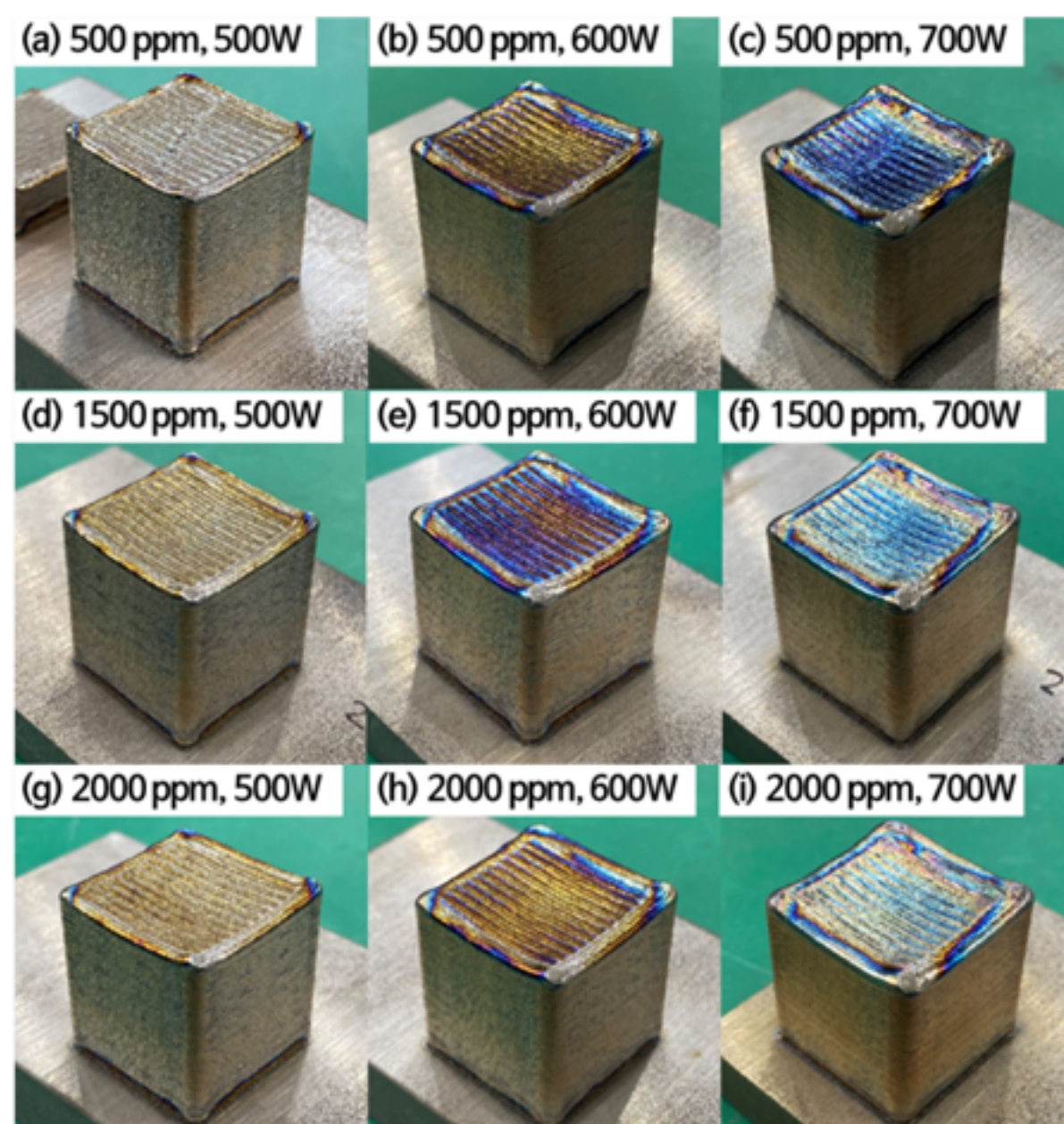
Sample name	:		Median size	:	29.18722 (μm)
ID#	:	202209281601054	Mean size	:	29.86897 (μm)
Data name	:	GR.23 15~53 RAW-1	Mode size	:	28.3819 (μm)
Transmittance (R)	:	98.2 (%)	Span	:	Off
Circulation speed	:	7	Diameter on cumulative %	:	(2)10.00 (%) - 21.9837 (μm)
Ultrasound	:	00:46 (7)		:	(5)50.00 (%) - 29.1872 (μm)
Iteration mode	:	Manual		:	(9)90.00 (%) - 38.5239 (μm)
Distribution base	:	Volume		:	
Refractive index (R)	:	1.60-0.00i(1.333)		:	
	:	[1.6(1.600 - 0.000i),water(1.333)]		:	



Category	Size(μm)	Distribution	Sum
1	13.246	0.000	0.000
2	15.172	0.176	0.176
3	17.377	0.780	0.956
4	19.904	2.900	3.856
5	22.797	8.390	12.246
6	26.111	17.485	29.731
7	29.907	24.702	54.434
8	34.255	23.136	77.570
9	39.234	14.364	91.934
10	44.938	5.860	97.794
11	51.471	1.789	99.583
12	58.953	0.417	100.000

- Analytical Equipment : HORBA(Laser Scattering Particle Size Distribution Analyzer, LA-350)

Particle size distribution of LOHF titanium alloy powder



- Density improvement of LOHF titanium alloy powder after AM
 - LOHF titanium alloy powder applied to AM
- Low oxygen and high density products → Enhanced elongation property

Introduction to Products and Services



▶ LOHFTi Premium Powder (Low Oxygen High Flowability Titanium Alloy Powder)

- Item : Ti Gr.2, Ti-6Al-4V Gr.5 / Gr.23 (ELI Ti-6Al-4V)
- Particle size : 15-53 μm , 45-150 μm
- Oxygen content : < 800 ppm
- Flowability : 26s/50g (ASTM B213)



▶ Deoxidation and Surface Heat Treatment

- Deoxidation and surface modification of titanium alloy powder
- Deoxidation and surface modification of titanium alloy powder with increased oxygen after Additive Manufacturing
- Customer-specific deoxidation and surface modification



▶ Oxygen-Nitrogen Analysis

- Oxygen-Nitrogen analysis of titanium and titanium alloy
- Bulk or Powder type analysis available
- Sample analysis results provided

LOTi Co., Ltd. provides titanium alloy powder with low oxygen high flowability powder for Additive Manufacturing by deoxidation and heat treatment for surface modification.

If you have any other questions or need any help, please feel free to contact us.

LOTi Co., Ltd.
CEO Jaewon Lim

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