

Certificate of Analysis

Product name	HAp(D) Microsphere	Lot No.	Sample
Quantity	5 g	Grade	20 – 45 μm
Date of Manufacture	Sample	Date of Issue	-

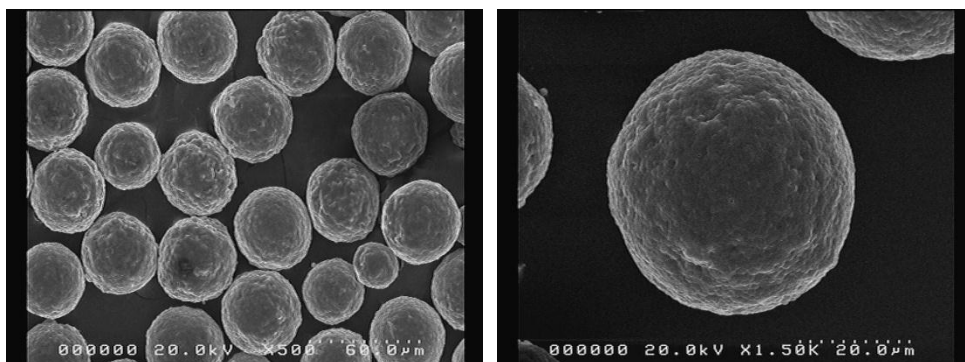
Test items	Test Method	Specification	Results
Appearance	Sensory test	White powder	White powder
Odor	Sensory test	Odorless	Odorless
Morphology	SEM observation	Spherical	Spherical
pH	Internal specifications	6.5 – 8.5	≤ 8
Impurities			
1) Arsenic (As)	ICP measurement	≤ 3 ppm	≤ 1 ppm
2) Cadmium (Cd)		≤ 5 ppm	≤ 0.5 ppm
3) Mercury (Hg)		≤ 5 ppm	≤ 0.05 ppm
4) Lead (Pb)		≤ 30 ppm	≤ 1 ppm
Total heavy metals		≤ 30 ppm	Conform
Particle size distribution (20-45 μm fraction)	Laser diffraction (PSA)	≥ 70 vol % between 20 and 45 μm	Conform
True density	Gas pycnometer	≥ 3.0 g/cc	Conform
HAp content	XRD analysis	≥ 95 %	Conform
CaO content	XRD analysis	≤ 1 %	Not detected
Foreign phases content (α -TCP, β -TCP, TTCP, CaO)	XRD analysis	≤ 5 %	Not detected
Ca/P ratio	XRD analysis	1.66 – 1.71	1.67

Shelf Life 5 years from the date of manufacture.

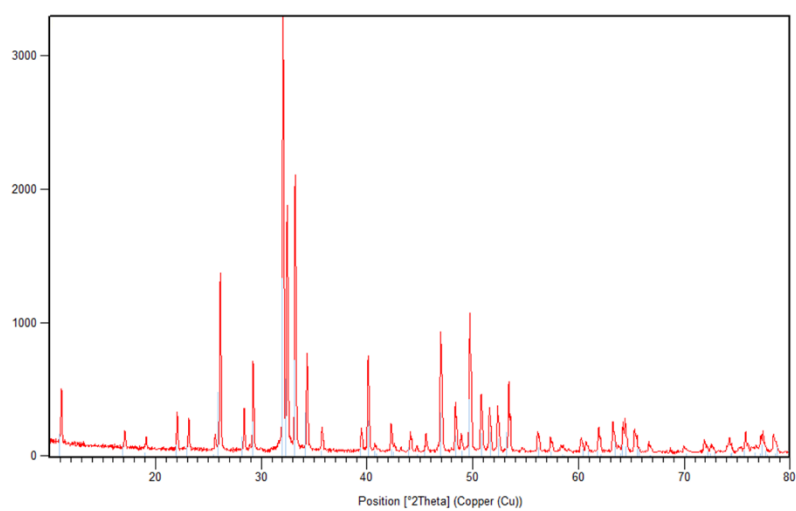
Storage Store in a cool, dry place. Avoid exposure to heat and moisture.

COA Issuer JSTechLab

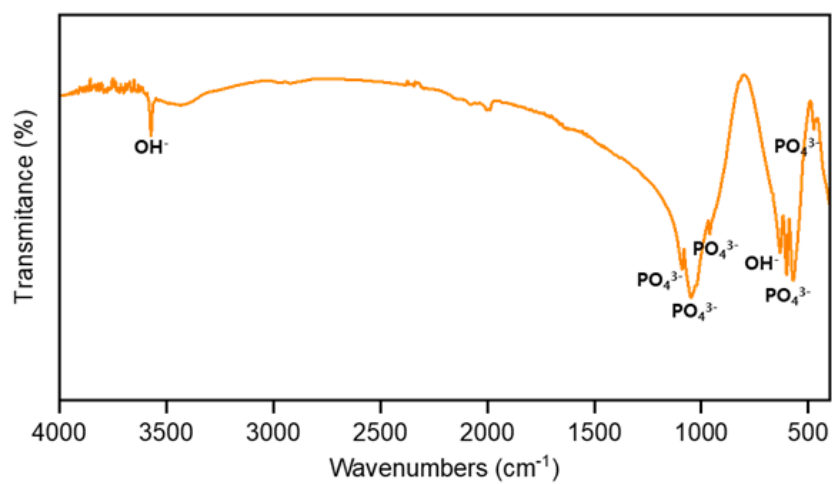
Notice The analytical results are provided for sample submission purposes only.



[SEM images]



[XRD pattern]



[FT-IR spectrum]

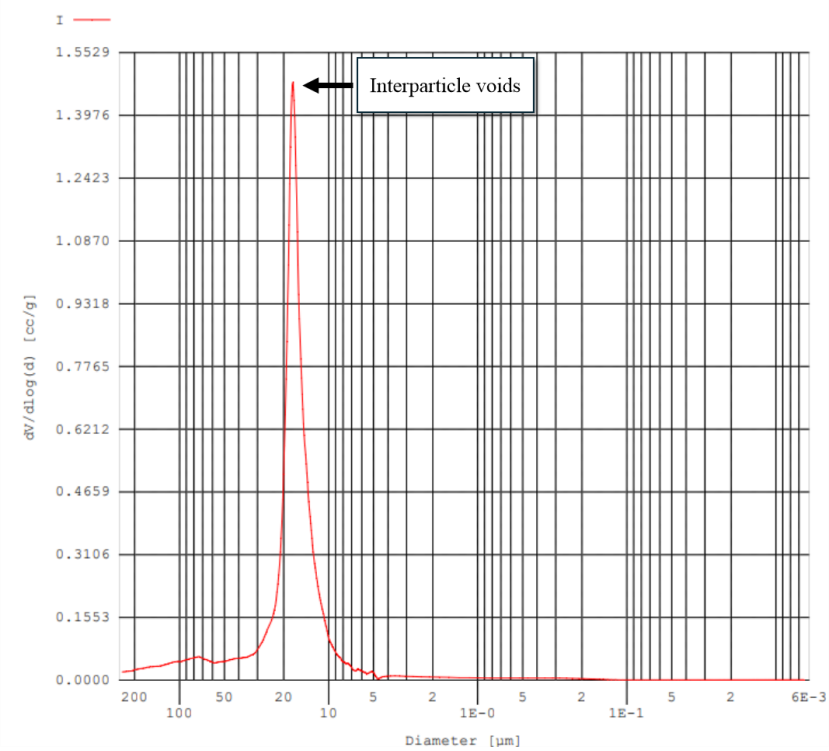
Summary Statistics	Measured Value (g/cm ³)	Test method
CV (%)	0.01	(1) Instrument: Micromeritics AccuPyc II 1340
SD	0.0003	(2) Analysis gas: Helium
		(3) Number of purges: 5
		(4) Purge fill pressure: 19.5 psig
		(5) Cycle fill pressure: 19.5 psig
Average	3.0210	(6) Rate: 0.005 psig/min
		(7) Analysis temperature: (23 ± 2) °C

* SD : Standard Deviation

* CV (%) : Coefficient of Variation = (SD/Average) x 100

[True density]

Property	Measured Value (g/cm ³)
Bulk Density	1.48
Tapped Density	1.77
[Bulk & tapped density]	



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Porosity Type	(%)
Interparticle	40.1
Intraparticle	1.2

[Pore Size Distribution (MIP)]

