

Certificate of Analysis

Product name	HAp(D) Microsphere	Lot No.	Sample
Quantity	5 g	Grade	20 – 45 μ m
Date of Manufacture	Sample	Date of Issue	26.03.16

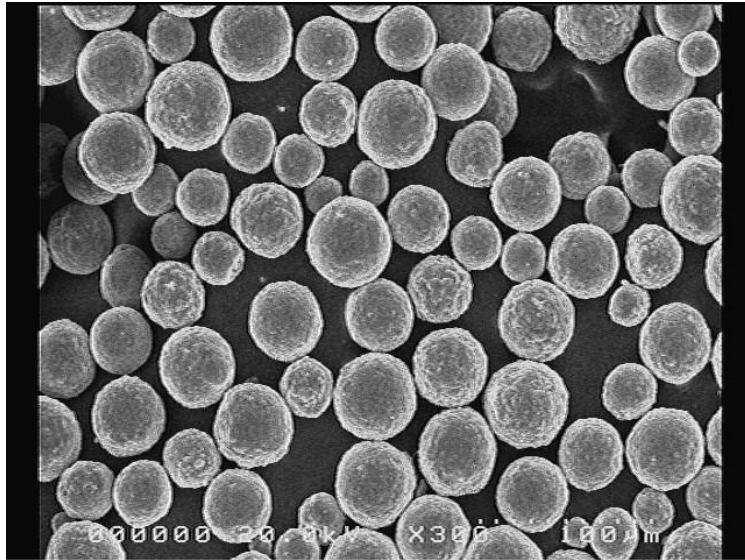
Test items	Test Method	Specification	Results
Appearance	Sensory test	White powder	White powder
Odor	Sensory test	Odorless	Odorless
Morphology	SEM observation	Spherical	Spherical
pH	Internal specifications	6.5 – 8.5	\leq 8
Impurities			
1) Arsenic (As)	ICP measurement	\leq 3 ppm	\leq 1 ppm
2) Cadmium (Cd)		\leq 5 ppm	\leq 0.5 ppm
3) Mercury (Hg)		\leq 5 ppm	\leq 0.05 ppm
4) Lead (Pb)		\leq 30 ppm	\leq 1 ppm
Total heavy metals		\leq 30 ppm	\leq 30 ppm
Particle size distribution (20-45 μ m fraction)	Laser diffraction (PSA)	\geq 80 vol % between 20 and 45 μ m	Conform
True density	Gas pycnometer	\geq 3.0 g/cc	Conform
HAp content	XRD analysis	\geq 95 %	Conform
CaO content	XRD analysis	\leq 1 %	Not detected
Foreign phases content (α -TCP, β -TCP, TTCP, CaO)	XRD analysis	\leq 5 %	Not detected
Ca/P ratio	XRD analysis	1.66 – 1.71	1.67

Shelf Life 5 years from the date of manufacture.

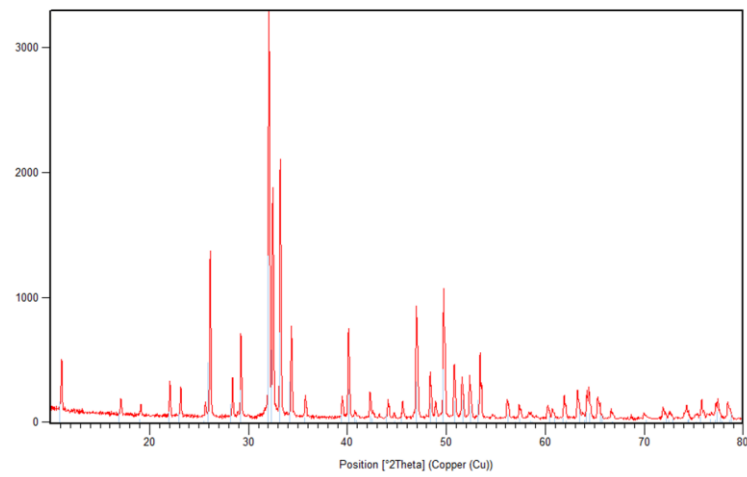
Storage Store in a cool, dry place. Avoid exposure to heat and moisture.

COA Issuer JSTechLab

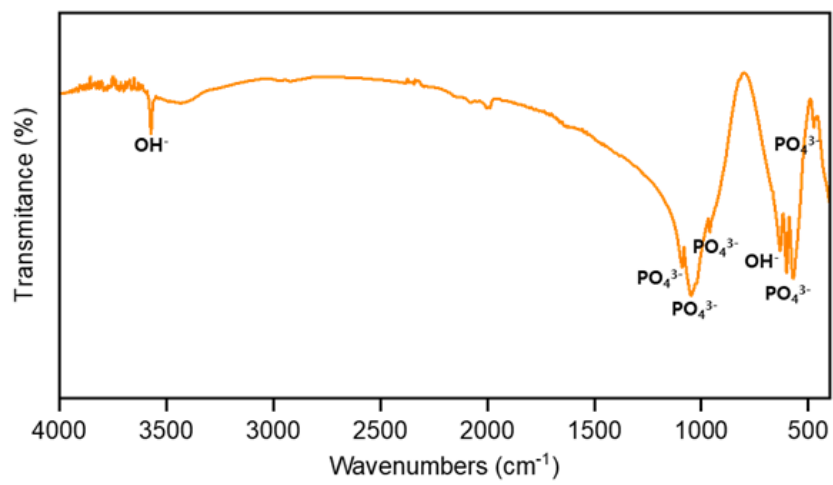
Notice The analytical results are provided for sample submission purposes only.



[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
Average	3.0210	(3) Number of purges: 5
		(4) Purge fill pressure: 19.5 psig
		(5) Cycle fill pressure: 19.5 psig
		(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]