Product Data Sheet

Product Name: Wollastonite
Cat. No.: GC81631

Chemical Properties

Cas. No.	13983-17-0		
Formula	CaH_2O_3Si	M.Wt	118.18
Solubility		Storage	Store at room temperature, keep dry and cool
General tips	For obtaining a higher solubility , please warm the tube at 37 °C and shake it in the ultrasonic bath for a while.Stock solution can be stored below -20°C for several months.		
Shipping Condition	Evaluation sample solution : ship with blue ice All other available size: ship with RT , or blue ice upon request.		
Structure			

Background

Wollastonite is a white, chain-structured pyroxene silicate mineral with biocompatibility, biodegradability, osteogenicity and antibacterial properties. Wollastonite induces transient pulmonary inflammatory responses, reversible alveolar macrophage responses, early inflammatory/proliferative mesothelial cell responses, ROS production, and mild chronic pulmonary interstitial inflammation in rats. Wollastonite induces osteogenic differentiation, promotes bone growth, supports angiogenesis, and facilitates the formation of hydroxycarbonate apatite on its surface. Wollastonite enhances the strength, bioactivity and biodegradability of hydroxyapatite scaffolds, and is used to construct porous

bone tissue engineering scaffolds. Wollastonite is applied in research related to diseases such as bronchitis, decreased lung function and bone defects [1] [2] [3].

In Vivo, Wollastonite (40 mg; intrathoracic administration; single dose) induces pleural sarcomas with variable incidence in female Osborne-Mendel rats[2]. Wollastonite (10 mg/m3; administered via inhalation; 6 hours per day, 5 days per week; for 12 or 24 months) induces mild interstitial fibrosis in male F344 rats, but does not increase their pulmonary tumor incidence[2]. Wollastonite (50-100 mg/m3; inhalation exposure; 6 hours per day; for 3 or 5 consecutive days) induces transient and milder pulmonary inflammatory responses in male Crl:CDBR rats compared with Crocidolite[2]. Wollastonite (25 mg; intratracheal administration; single dose) induces mild to moderate pulmonary effects in male Wistar rats[2]. Wollastonite (1 mg; intratracheal administration; single dose) induces mild, non-progressive chronic interstitial inflammation in male Sprague-Dawley rats within 6 months[2]. Wollastonite (114 mg/m3; exposed via inhalation; 6 hours per day for 5 consecutive days) has a retention half-life of less than 1 week in male Crl:CDBR rats, indicating that it can be rapidly cleared from the lungs[2]. Wollastonite-based scaffolds doped with dilute magnesium (CSi-Mgx) fabricated via 3D printing (surgical implantation; single administration) exhibit excellent strength, degradability and osteogenic capacity, rendering them promising for bone regeneration of thin-wall bone defects in rabbits[3]. Wollastonite-hydroxyapatite composite biomaterial (surgical implantation; single administration) safely enhances vascularization and promotes new bone formation at the surgical defect site of the femur in rats at 12 weeks post-implantation[3].

In Vitro, Wollastonite exhibits higher strength than traditional porcelain in low-temperature fired ceramics (67 MPa at 1200°C), along with the characteristics of lower firing temperature, less energy consumption and self-glazing; it shows better glossiness, spreadability and whiteness in glaze formulations; in facing tile mixtures, it reduces drying/firing shrinkage and wet expansion rate, and improves deformation resistance, heat resistance and frost resistance[1]. Wollastonite exhibits significantly lower cytotoxicity towards cultured rabbit alveolar macrophages than chrysotile asbestos; it also has lower hemolytic potential and induces lower levels of lipid peroxidation in red blood cells; in cell-free deoxyribose and PMN leukocyte systems, it generates higher levels of non-hydroxyl radical reactive oxygen species than asbestos[2]. Wollastonite (10 wt%) increases the water absorption rate of PHBV scaffolds by 44.1% compared with pure PHBV scaffolds, thereby enhancing their

applicability in biological applications[3]. Wollastonite coatings can form hydroxycarbonate apatite upon immersion in simulated body fluid, exhibiting in vitro bioactivity[3]. Wollastonite glass-ceramic scaffolds support the growth and adhesion of human mesenchymal stem cells, and form a fused cell layer after 21 days of osteogenic culture[3].

References:

[1]. Azarov GM, et al. Wollastonite raw materials and their applications (a review). Glass Ceram. 1995;52:237-240.
[2]. Maxim LD, et al. A review of the toxicology and epidemiology of wollastonite. Inhalation toxicology. 2005 Aug;17(9):451-66.
[3]. Zenebe CG, et al. A Review on the Role of Wollastonite Biomaterial in Bone Tissue Engineering. BioMed research international. 2022;2022:4996530.

Caution: Product has not been fully validated for medical applications. For research use only.
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