Occurrence of hydrozincite biomineralization in Naracauli (Sardinia, Italy): Structural properties and morphological features

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Hydrozincite Zn_5 $[(CO)_3]_2$ $(OH)_6$ biomineralization occurs seasonally at Naracauli creek (southwestern Sardinia), due to the activity of a microbial community [1]. Zinc in the creek is derived from the drainage of several abandoned mines. Monitoring of the Naracauli waters from 1997 to 2009 shows that optimum conditions for hydrozincite biomineralization are solution saturation and values of Zn/CO_3 molar ratio close to 1. These conditions can be attained only after periods (usually weeks) from intense rainfall.

High Resolution Transmission Electron Microscopy indicates that hydrozincite biominerals comprise small (2-4 nm) nanocrystals that aggregate by an imperfectly oriented aggregation mechanism [2]. The aggregates are micrometric mesocrystals that appear as platelets flattened onto (100) and made up of hydrozincite globules.

Imaging hydrozincite samples from different locations in the creek by Scanning Electron Microscopy shows that the globules grow and coalesce to built sheaths. The shape of these sheaths depends on stream-flow conditions. Sheaths grown under low hydraulic flow are about 100 μm wide and short in length. In contrast, sheaths grown under high-flow conditions are about 50 μm wide and several hundreds of μm long. In agreement with previous in vitro experiments [3, 4], we interpret hydrozincite biomineralization as biologically controlled. Formation of hydrozincite serves as a Zn-limiting mechanism in waters of Naracauli creek. In addition the hydrozincite biomineralization is effective in the uptake of other heavy metals [4]

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Study of upper Miocene oysters (Plecypoda) from the Mishan Formation in South West of Firuzabad, Fars, Iran (Zagros mountain)

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The out crapes of Mishan Formation located in Aghar area (Firuzabad city) south west of Fars and 70km south west of Firuzabad. this formation mostly consists of limestone, marly limestone and marlstone with 800m thickness. 6key beds distinctive from limestone beds are recognized in this area. this key beds are useful for local and regional correlation in Zagros mountains. the key beds from base to top are: Red algae, Bryozoa, Gastropoda and Plecypoda, Crabs and Oysters. Mishan Formation in this area is between Gachsaran F.M (Under Formation), Conformable and Aghajari F.M (Upper Formation), Conformable. With due attention to rang and distribution of the Macrofossils, 5 local assemblage biozone were recognized, that is confirming time limit from Early- Upper Miocene. this research checked and controlled a biostrom Plecypoda (Oysters) level by thickness 3- 4m. this biostrom located around 550m the base of section. Ofcurse more of this Plecypoda be assigned to order pterriodia and Genus Oyster. Along with Oysters, Pecten and Venus can be see. This biostrom made up a bioclastic shoal shallow deep in the margin of sea Miocene. This Oysters report from Mishan Formation of Firuzabad, Fars, Zagros, Iran: Ostrea virleti var. crassicostat, Ostrea virleti Desh var. persica, Ostrea digitatai Echiwald var. rohlfsi, Ostrea lamellose. Ostrea cf. biowwondeli.