AN UNUSUAL QUARTZ MICROBIALITE FROM THE BELGIAN CRETACEOUS. IMPLICATIONS FOR LOW TEMPERATURE QUARTZ CRYSTALLOGENESIS.

BAELE J. M., Mons Institute of Technology, Mons, Belgium.

Amorphous silica microbialites have been well documented from recent hydrothermal environments. Quartz-cemented microbialites are commonly assumed to result from opal recrystallization (cf. Precambrian cherts). But direct quartz crystallization associated with microbial/fungal mats is quite uncommon throughout the literature.In the Upper Turonian chert beds of the Mons Basin (Belgium), an unusual orange quartz rock occurs as cavity infills. The rock consists of dense microbial/fungal buildups that are perfectly fossilized within chalcedony and megaquartz crystals (up to 4mm). The microorganisms are outlined by refractive index change, iron-stained quartz or goethite needles. Numerous morphologies are observed: single or intricate filaments/hyphae, sort of fruiting bodies, hairy bacterial inflorescences, laminar and tubular veils, blobs with hairy overgrowth, etc.This peculiar quartz microbialite have been deposited in a very shallow continental to littoral environment which corresponds to the Turonian-Coniacian sea-level fall. The good preservation of the microorganisms is due to cavity concealing and rapid silicification. The quartz matrix protected the organic material against marine flooding diagenesis and its destructive effect (pyritization).Optical and SEM investigations give a number of evidences that well-ordered megaquartz crystals deposited directly on the organic substrate, with some control of the nucleation density. This study indicates that clear euhedral megaquartz can form in conditions opposite to those that are commonly expected (pure and dilute aqueous medium, adequate nucleation substrate, very slow crystallization rate, etc.). Furthermore, any mechanical disturbance has been noted, even at the infra-micrometric scale, giving the evidence that quartz does not develop force of crystallization, at least in certain conditions.