Research on environmental protection construction of urban road tunnel

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Recently, with the acceptance of scientific development view in our country's economic construction, the environmental protection construction of urban road tunnel attracts all parties' attention increasingly. The environmental protection problem and its harm of urban road tunnel in construction stage are discussed from four aspects: engineering spoil, air pollution, noise pollution and water pollution. And environmental protection measures are summed up in detail. The environmental protection construction of urban road tunnel is systematic engineering, which should be paid more attentions by all parties. Research results provide references to other similar projects.

The layered growth and reticulated crystallization of the coral fibers

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Current geochemical models for crystallization of the coral fibers consider that crystal growth occurs within a liquid layer the composition of which is 'close to sea water'. Spatial arrangement of the resulting crystalline units is admittedly due to 'crystal growth competition'. Experimental evidences do not support these views.

Etched surfaces show that growth of the coral fibers is permanently controlled at the micrometer length-scale. The mechanism by which corals succeed in creating their species specific septal morphologies relies on modulation of the thickness of the growth layers all along corallite development. This layered and controlled mode of growth explains the long recognized species-specific spatial arrangements of the coral fibers.

Synchrotron based XANES mapping has revealed a biochemical banding pattern in exact correspondence to the mineral layering. This result implies that mineral and organic components are associated at an infra-micrometer level. Atomic force microscopy (tapping mode and force measurements) have revealed the morphological pattern of the mineral organic interplay at the x10 nanometer length scale. Similarity of these structural and compositional patterns between corals and molluscs fully disprove the widely shared concept of an essential difference between the 'biologically induced' and the 'biochemically controlled' modes of biocrystallization.

Crystallization occurs synchronically within the whole growth layers. Mapping of magnesium distribution underlines the cyclicity of the skeletal growth, suggesting a possible role of Mg in triggering the crystallization as a final step of the mineralization of each micrometer thick growth layer.

This also suggests that distribution of the organic and mineral phases, as seen at the atomic force microscopy, results from this last step in the mineralization process. Within the organic gel in which crystallization occurs, the organic components are maintained out of the developping crystal lattice, producing the reticulate appearance of the crystallized growth layer.