Bio-inspired study of structural aspects of calcium carbonate with inorganic inclusions

EVA SEKNAZI[1] , BOAZ POKROY[1]

[1]Department of Material Sciences and Engineering and the Russell Berrie Nanotechnology Institute, Technion – Israel Institute of Technology, Haifa, Israel
eva.seknazi@campus.technion.ac.il

Biominerals often demonstrate excellent properties associated with highly controlled and elaborated compositions and structures. Most of marine biominerals are made of calcium carbonate, which often crystallizes from an amorphous precursor and incorporates organic and inorganic inclusions in a fashioned way. This non-classical crystallization pathway is believed to be critical in the formation of these complex composites. Moreover, the organic and inorganic inclusions and their organization in calcite are believed to play important roles in the biogenic calcite superior mechanical properties.

We examined the role of inorganic inclusions in amorphous calcium carbonate and in calcite on their structure, stability, and mechanical properties. For this purpose, synthetic impurity-bearing amorphous calcium carbonate and calcite systems were synthesized and analysed.

These features are of interest for the understanding of biomineralization processes, the basis of the superior properties of biominerals and for the design of new materials.