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GIULIO NATTA

On Biomineralization: from mechanisms to structure and properties of biominerals

Prof. Fabio Nudelman
(University of Edinburgh)

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Room Natta, Building 6
Piazza Leonardo da Vinci, 32 Milano

live | online link will be emailed to registered participants

[Registration Form](#)

In Nature, organisms from all 5 kingdoms are well known to produce a wide range of mineralized tissues combining inorganic and organic materials that are used for a large number of functions. Examples are shells and coral skeletons that give protection for the animals, magnetic particles in bacteria used for navigation and vertebrate bone that provide mechanical support and protection for the body. In all cases, the precipitation and crystallisation of the inorganic materials are controlled by specialized proteins and polysaccharides, resulting in mineralized tissues with extraordinary morphologies and remarkable mechanical properties. Our research is aimed at understanding how organisms control the formation of such mineralized tissues, and how their properties arise from their structures. In this talk I will present a variety of systems my group has been working on in the last years, including the mechanisms of CaCO_3 formation by marine unicellular algae, self-assembly of collagen molecules into fibrils, and the structure and material properties of sea shells, in particular the remarkable responsiveness of their mechanical properties to hydration.

Dr Fabio Nudelman graduated in Biomedical Sciences from the Federal University of Rio de Janeiro. He then moved to the Weizmann Institute of Science, Israel, where he obtained an MSc degree in Life Sciences and a PhD in Chemistry, under the supervision of Prof. Steve Weiner and Prof. Lia Addadi. He was a postdoctoral research fellow at the Laboratory of Materials and Interface Chemistry, Eindhoven University of Technology, Netherlands under the supervision of Prof. Nico Sommerdijk from 2008 to 2013. After that he received a Chancellor's Fellowship to start his independent research group at the Dept. of Chemistry, University of Edinburgh, where he is now a Senior Lecturer. Dr Nudelman conducts research in the areas of biomineralization and synthetic and biomimetic crystallization, using conventional and cryogenic electron microscopy to study the formation and structure of mineralized tissues. Research topics in his laboratory include the biomineralization of calcium carbonate by unicellular algae, bone formation, structure and properties of shells, and crystallization of organic compounds.