Spécialité : MATÉRIAUX / Sciences et technologies des matériaux

Laboratoire : IRAMIS/SPEC/SPHYNX

Atomic force microscope comparisons of fossilized and modern brachiopods

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Stage pouvant se prolonger en thèse : Non
Durée du stage : 6 mois

Résumé:
The IMAFMP team will analyze Brachiopods from the Palaeontological collections of the Muséum National d?Histoire Naturelle (MNHN, Paris) in collaboration with S. Charbonnier and D. Gaspard, MNHN.

Sujet :
The brachiopods, present since the Early Cambrian (more than 500 MA), are benthic marine invertebrates living attached to various kinds of substrates. These organisms possess a bivalved shell (ventral and dorsal). Within the subphylum, there are 3 series: (1) Rhynchonelliformea: This is the first series of the 3 subphyla, with a shell composed of low-magnesium calcite; (2) Craniiformea: The shells concerned are composed of higher amounts magnesium calcite; and (3) Linguliformea: These species possess a shell composed of apatite (calcium phosphate). Brachiopods still live in modern seas and oceans all over the world. Yet, the species diversity has decreased. Thus, brachiopods remain a true witness of (palaeo)environments. Figure 1 depicts the process of secretion of the shell, which has 2, or even 3, layers. From the figure, one can see microstructural organization from the generative zone of the mantle tissue.
When working on fossils shells, it is important to analyze living specimens in parallel to understand what is susceptible to modifications during fossilization. The Peak-Force Atomic Force Microscopy (PF-AFM) allows us to reach the nano-level of the hierarchical architecture of the shell complementing Scanning Electron Microscopy observations (SEM) (Gaspard & Nouet, JSB, 2016).

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