ESRF	**Experiment title:** Infrared mapping of biogenic carbonates	**Experiment number**: IN676
Beamline:	**Date of experiment**: from: 18/09/2008 to: 19/08/2008	**Date of report**: 12 nov 2008
Shifts: 4	**Local contact(s)**: Marine Cotte	*Received at ESRF:*

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Report:

The experiment was dedicated to FTIR maps of modern and fossil biogenic carbonates. Modern Mollusc shells (*Pinna, Mytilus*), black pearls from Tahiti, and gastrolith from arthropod were used. Fossil samples were Triassic aragonite corals from Turkey.

The ability of the FTIR to discriminate between various polymorphs of calcium carbonate (vaterite, calcite and aragonite) was used for complex structural and mineralogical modern samples (pearls, mollusc shells). The difference between secondary sedimentary filling (calcite) and primary aragonite skeleton of fossil corals are also well seen in these maps. Moreover, the high resolution of the ID21 FTIR microscope has allowed us to detect diagenetic changes within the skeletons.

Another interest of such maps is to detect and identify the organic components of biogenic carbonates. It is well known that these biominerals are not pure minerals, but are complex mixtures of organic and mineral components. As for the structure and mineralogy, the composition and spatial distribution of these organic components is species specific.

It has been shown par experimental data and observations that the organic components control the biomineralization processes, and that they play a major rôle in diagenetic changes. The comparison of the SEM images, in situ chemical analyses (WDS and/or EDS), FTIR maps, TOF SIMS maps… allows a better understanding of these biogeochemical processes.

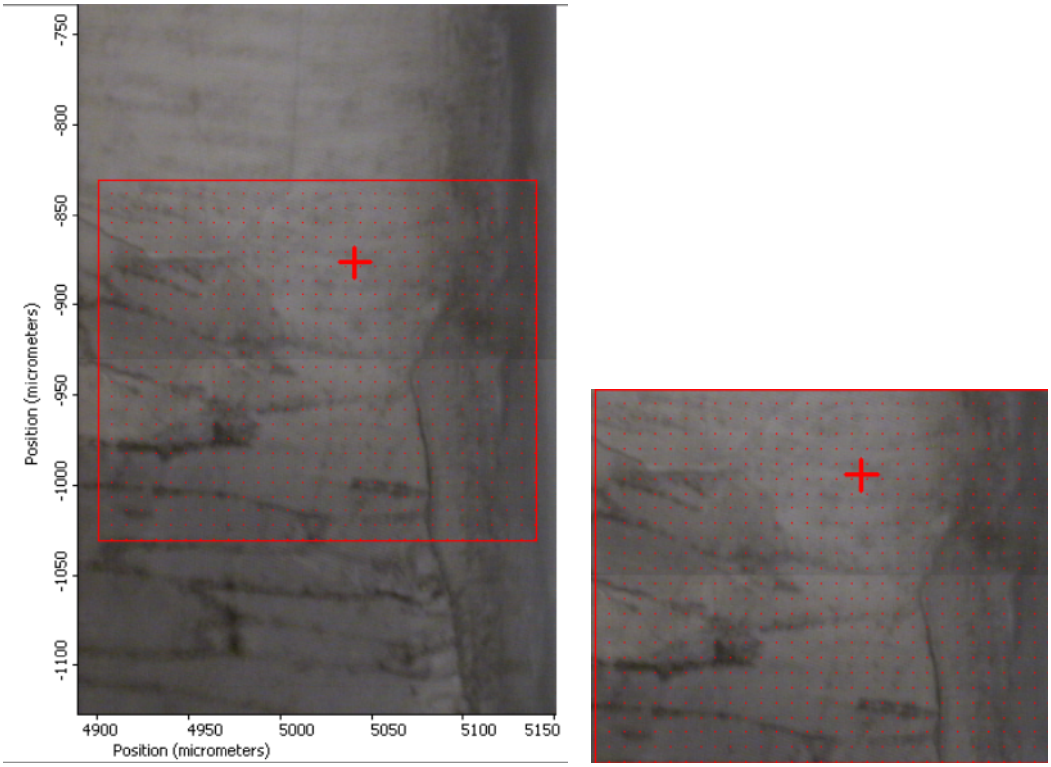

Fig. 1: Location of the FTIR maps in a black pearl from Tahiti, showing the prismatic structure with thick organic sheets on the left part, and the aragonite nacreous layer in the right part

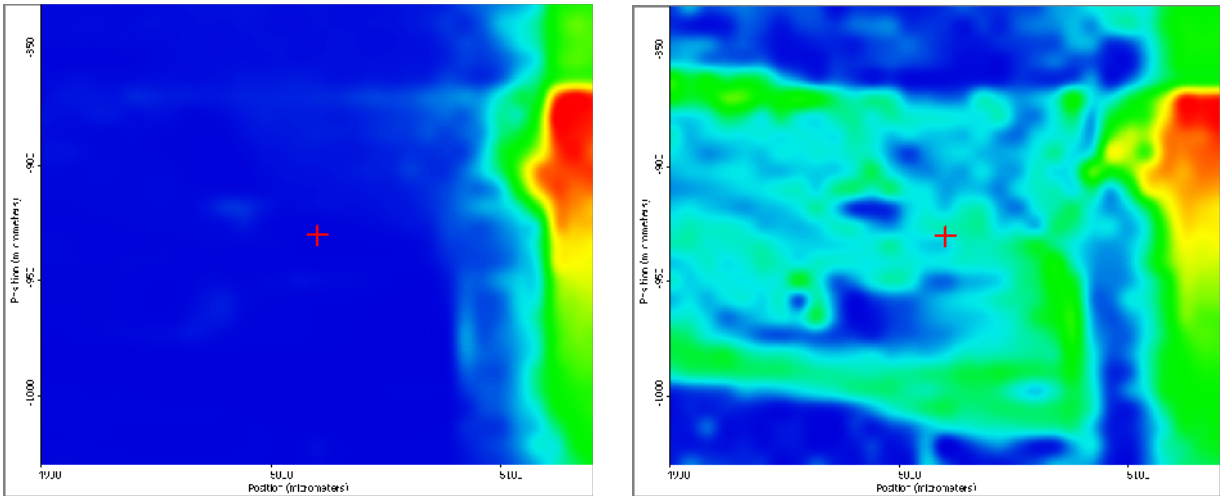

Fig. 2: FTIR maps of the Fig. 1.
Left map: at 1428 cm-1 showing the aragonite (blue and red right zone) and calcite (blue left zone).
Right map: at 1673 cm-1 showing the difference of organic composition (amide I).

The local contact was efficient and present all along the experiment.
We hope to publish several papers in international scientific journals with data acquired during this experiment.