	Experiment title: Amelogenin	**Experiment number**: MX-199
Beamline: ID13	**Date of experiment**: from: 11.06.05 to: 11.06.05	**Date of report**: 10.03.05
Shifts: 1	**Local contact(s)**: Manfred Burghammer, Christian Riekel	*Received at ESRF:*

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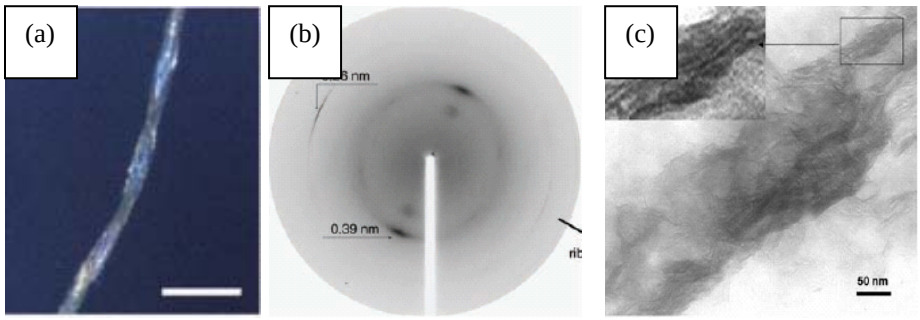
Report:

Many living organisms can precipitate minerals, for example mollusks form calcite crystals in their shells and vertebrates generate the apatite crystals found in bones and teeth. Generally a specific set of macromolecules—including proteins, polysaccharides, proteolipids, and proteoglycans—regulates nucleation, growth, size, and orientation of the crystals. There is general agreement that matrix macromolecules and tissue architecture are important in nucleating and localizing mineral formation, but major questions remain.

Here we report data that bring light on one of these processes, namely the formation of enamel in vertebrate teeth. The organization of amelogenin that constitutes the primary entity of the dental enamel extracellular matrix. This proteins undergoes to several degrees of aggregation ending with the formation of birifrangent micro-ribbons. The amelogemin micro-ribbon organization and mineralisation properties had been studies using various techniques. The x-ray diffraction pattern for



(a) birefrangen micriribbon; (b) x-ray diffraction pattern; (c) TEM section of the micro-ribbon.

amelogenin ribbon was collected at the ESRF at the beam line ID13, using a 5 μm beam size at 100 K. The pattern was recorded on a MAR CCD X-ray detector, using a wavelength of 0.976 Å and a ribbon-detector distance of 130 mm. Since the micro-fiber had small dimensions only the micro-beam allowed the x-ray diffraction data collection.
The results have wider implications for the mechanisms by which organisms control mineral deposition and they will be a useful guide to the development of biomimetic structures.[1]

C. Du et al, Science, 2005, 307,1450.