

## Two dimensional elemental mapping and non-destructive characterization of the elements accumulated in biominerals and related environmental specimens

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Nacreous layer of a pearl with beautiful luster is consisted of aragonite, which is the metastable form of calcium carbonate under ambient pressure and temperature. The X-ray fluorescence analysis was applied to search the trigger elements which would induce the specific formation of aragonite in the seashell.

The pearl specimen cultivated in Japan was made into a thin section for the two dimensional imaging. The incident X-ray monochromatized in 17.1 keV was reduced to  $40 \times 40 \mu\text{m}^2$  and the fluorescence X-ray was detected by (Si, Li) semiconductor detector with moving the specimens with  $40 \times 40 \mu\text{m}^2$  steps.

A core of the pearl is processed from of the nacreous layer of a freshwater shell and the pearl oyster forms the pearl layers wrapping the core. Calcium and Sr exist uniformly in both of the core and nacreous layers (Fig. 1), however, the abundance of Sr in the pearl layers is larger than the core. This would reflect the higher concentration of Sr in the sea so that Sr could be regarded as an impurity from environment which is substituted with Ca in the  $\text{CaCO}_3$ . On the other hands, Zn appears in the initial part of the pearl layer locally and it could be considered that Zn might act as a trigger for the aragonite formation in the pearl oyster.

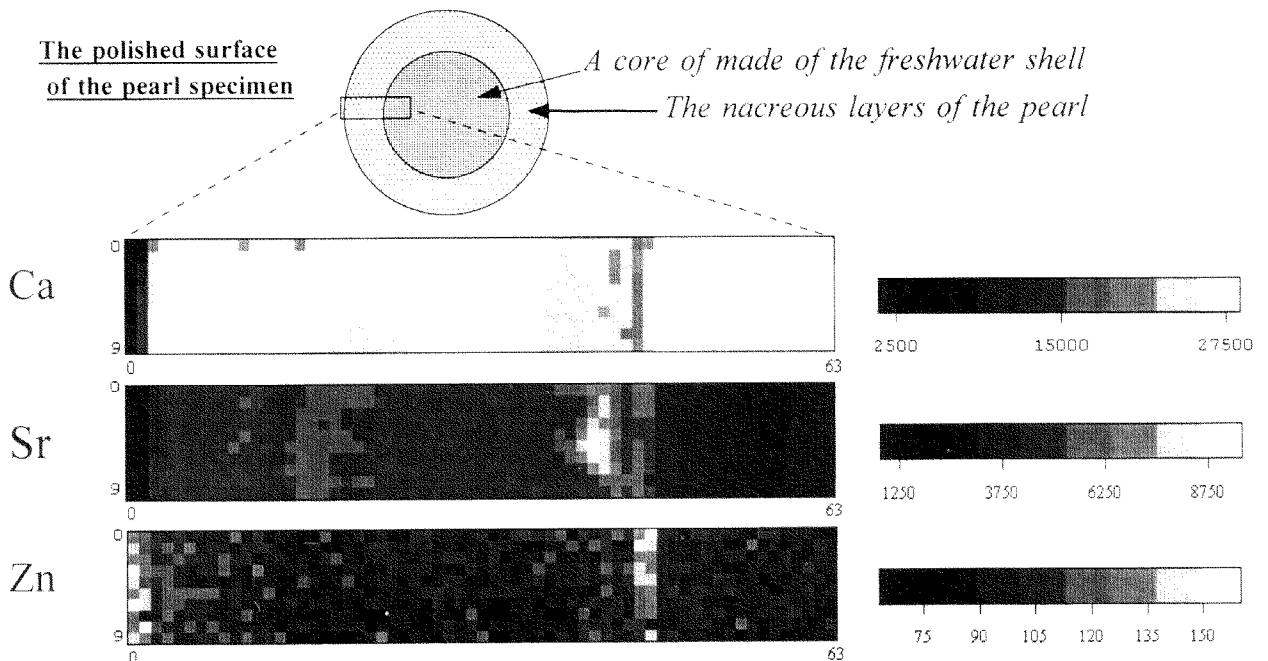


Fig. 1 Two dimensional elemental mapping for Ca, Sr, and Zn inside the pearl.