

# Electron microscope imaging of tooth remineralization prepared by focused ion beam

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In this work we have developed focused ion beam (FIB) technology<sup>1</sup> for ultra-structure imaging of tooth enamel<sup>2</sup> and surface remineralization by using scanning and transmission electron microscopy. Cross-section specimen has been made on the tooth surface, after treated by the bio-active materials. Subsequent transmission electron microscope (TEM) imaging, electron diffraction, and energy dispersive spectrum (EDS) examinations have shown that the surface remineralization has the similar structures and chemistry to the human enamel, which is mainly composed by hydroxyapatite crystals. FIB milling has been proved as an efficient way to prepare high quality TEM specimen without causing too much damages. The advantages and disadvantages of this method over the traditional preparation techniques were also discussed. The characterization of the microstructures and the interface structures has also greatly improved our understanding to the tooth biomineralization. This work also pointed out the potential applications of advanced characterization techniques to the consumer industry research.

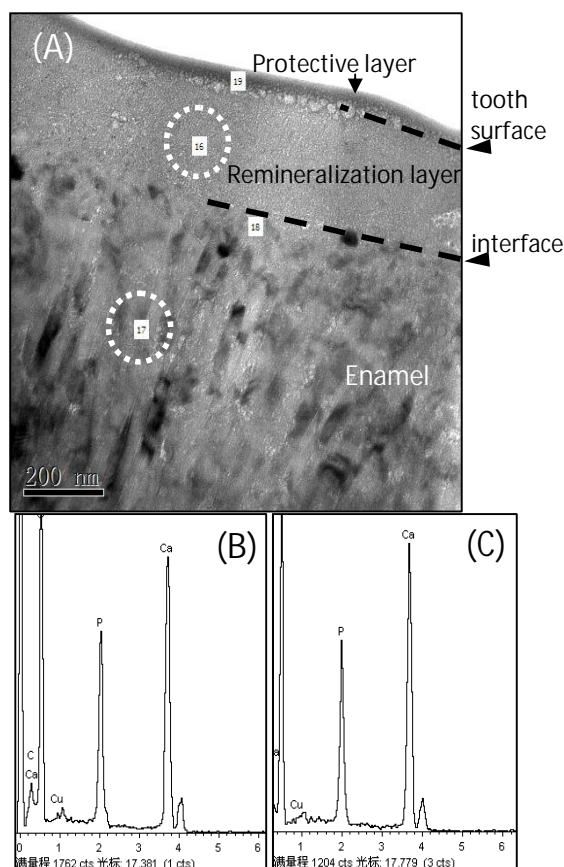


Figure 1: (A), TEM micrograph of the cross-section of tooth enamel, and the top layer led by remineralization; (B) and (C), EDS spectra obtained from enamel and remineralization layer, respectively.

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