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Nano-Structure and Nano-Mechanical Properties of Human Teeth

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Abstract: *In this study, we investigate the nanostructure and nano-mechanical properties of human teeth. A nano-indenter is adopted to acquire the nano-mechanical properties of teeth, while a focused ion beam system (FIB) is used to prepare high quality transmission electron microscopy specimen. For nanomechanical properties, the tooth specimens are cut into horizontal and vertical sections separately within 1mm thick. All the sections contain dentin, dentinenamel junction (DEJ) and enamel. The hardness and Young's modulus of each compartment are systematically measured, both showing an increasing trend from the dentin to the enamel. As to the preparation for transmission electronic microscope (TEM) specimen, the teeth are cut into 50 nm thickness. High resolution images and diffraction patterns reveal that dentin is poly-crystallized and present anisotropic properties..*

Keywords: nano-mechanical, teeth, nano indenter, FIB, TEM