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## Preparation and characterization of fluoride calcium silicate composites with multi-biofunction for clinical application in dentistry

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### Abstract:

Fluoride calcium silicate (FCS) are widely used in dental tissue engineering due to their excellent biological properties. This study aimed to develop novel FCS with multiple biofunctions as toothpaste additives. In this study, the preparation of composite FCS, morphologies of the composites and the *in vitro* biofunctions were investigated. Calcium silicate with 0.7% (wt) fluoride was prepared by co-precipitation method. Pure calcium silicate (CS) was synthesized for controlling study. Biomimetic mineralization study was conducted in simulated body fluid (SBF), the composition, phase structure, apatite formation and morphology were investigated by X-ray Fluorescence Analysis (XPS), X-ray diffraction analysis (XRD), Fourier transform infrared spectroscopy (FTIR), scanning electron microscope (SEM) and transmission electron microscope (TEM). *In vitro* cell viability studies showed that the fluoride ions promoted cell proliferation and differentiation. This study indicated that FCS shown good bioactivity to induce apatite formation and it could be a promising toothpaste additives with specific biofunction.

**Keywords:** Fluoride calcium silicate; Apatite; Biological properties; Biocompatibility.

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