Supporting Information

Bioinspired heptapeptides as functionalized mineralization inducers with enhanced hydroxyapatite affinity

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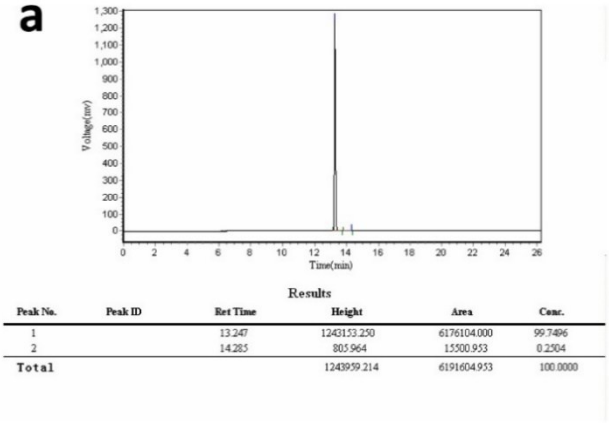

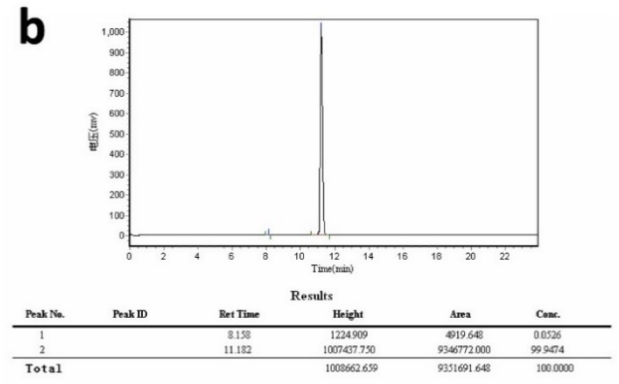

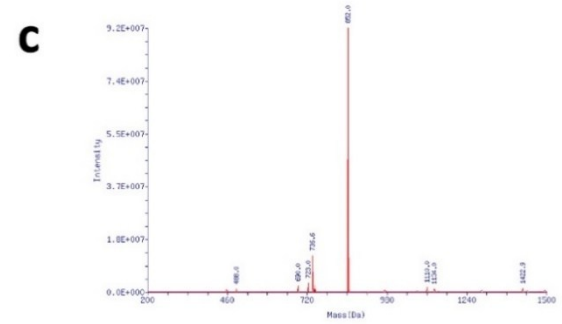

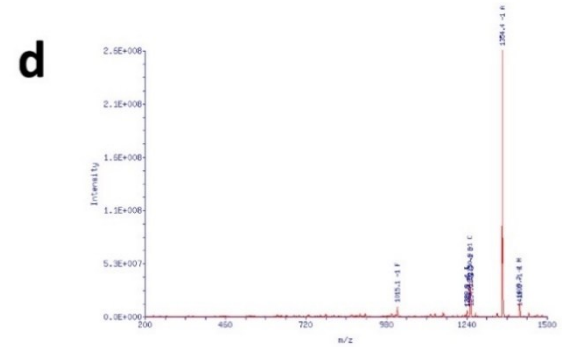

Figure S1. HPLC chromatograms of (a) Peptide-7 and (b) Peptide-7-FITC; the distinct peaks represent the characteristic peaks of Peptide-7 and Peptide-7-FITC. The mass spectra of (c) Peptide-7 and (d) Peptide-7-FITC.

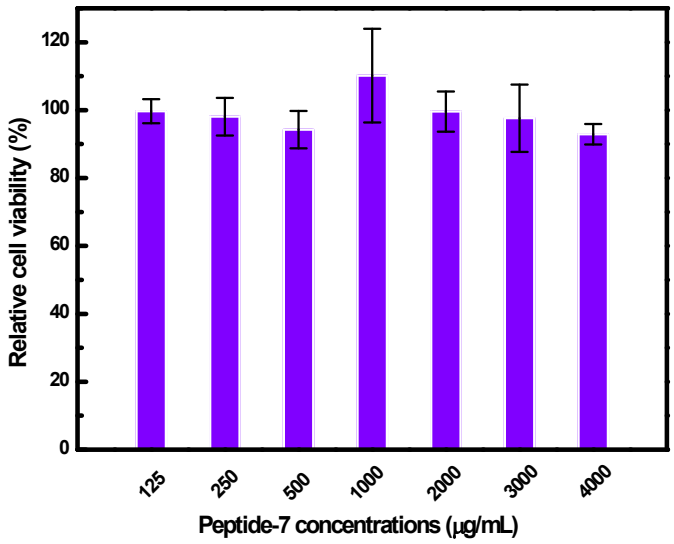

Figure S2. Cytotoxicity of Peptide-7 at various concentrations (from 125 to 4000 μg/mL). The cytotoxicity was evaluated by CCK-8 assay using HOK (human oral keratinocyte) cells.

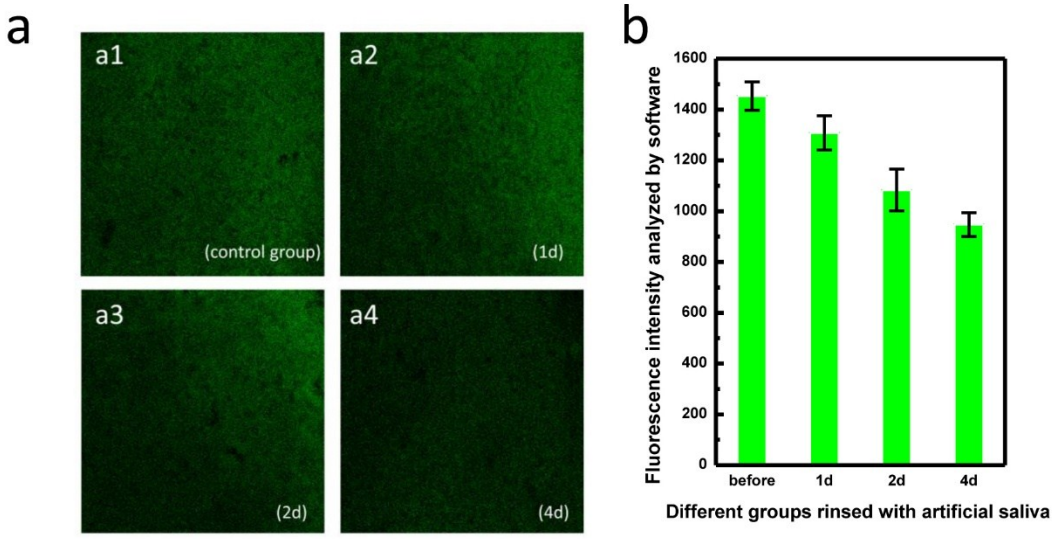

Figure S3. (a) CLSM fluorescence images of HA disk surfaces. (a) a1, before washout; a2, after one-day washout; a3, after two-day washout; a4, after four-day washout. (b) The fluorescence intensity was calculated by the software to estimate the amount of Peptide-7-FITC retained on HA surfaces after being washed for different number of days. The histogram shows the fluorescence intensity descending process.

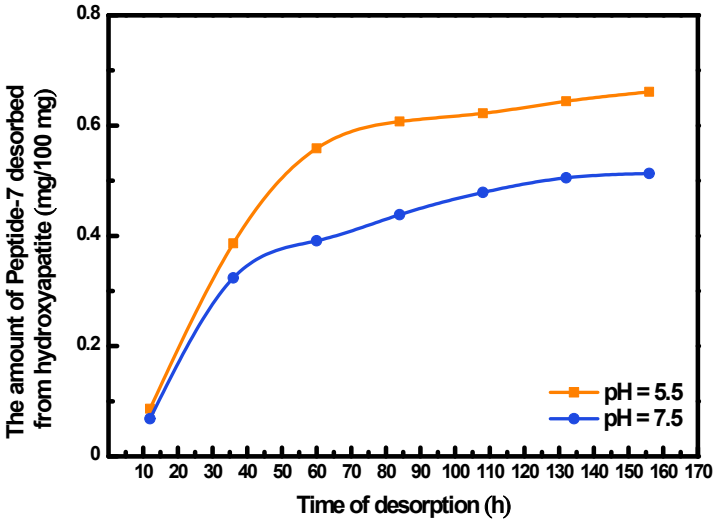

Figure S4. Desorption isotherm curves of Peptide-7 from HA powder. The orange line represents acidic condition (pH = 5.5) and the blue line represents neutral condition (pH = 7.5).

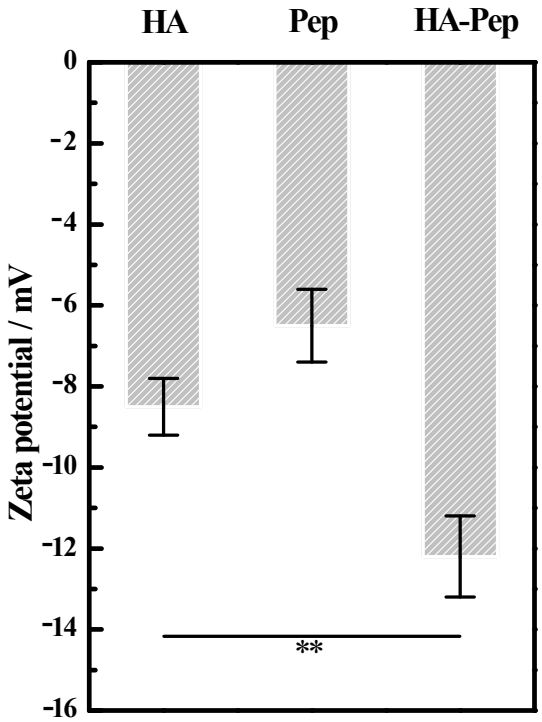

Figure S5. Zeta potential of HA (HA particles before adsorption of Peptide-7), Pep (Peptide-7 in solution) and HA-Pep (HA particles after adsorption of Peptide-7); **, $p < 0.01$.

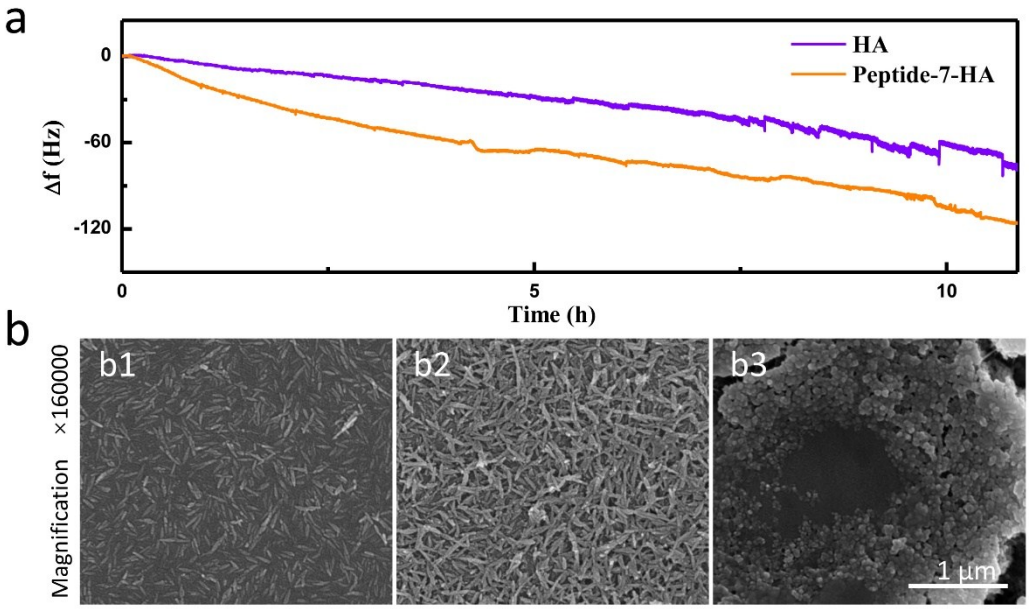

Figure S6. (a) QCM-D results of the mineralization ability of Peptide-7 after adsorption on HA chips. The declines in frequency were 68.73 Hz and 115.41 Hz in the control group and experimental group, respectively, over a period of 12 h. (b) SEM images of HA chips before (b1) and after incubation in flowing artificial saliva for 12 h (b2 and b3). The control group (b2) used bare HA chips and the experimental group (b3) used Peptide-7 coated HA chips (pH = 7.5).

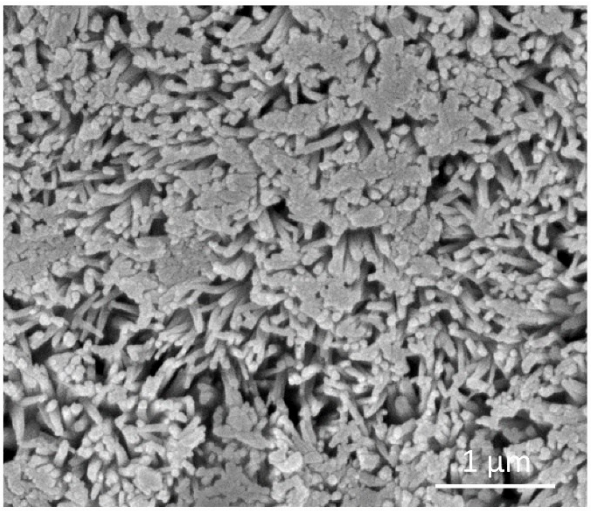

Figure S7. SEM image of the surface morphology of NaF treated enamel, showing rod-like microstructures on the enamel surface (Magnification ratio is 25000).

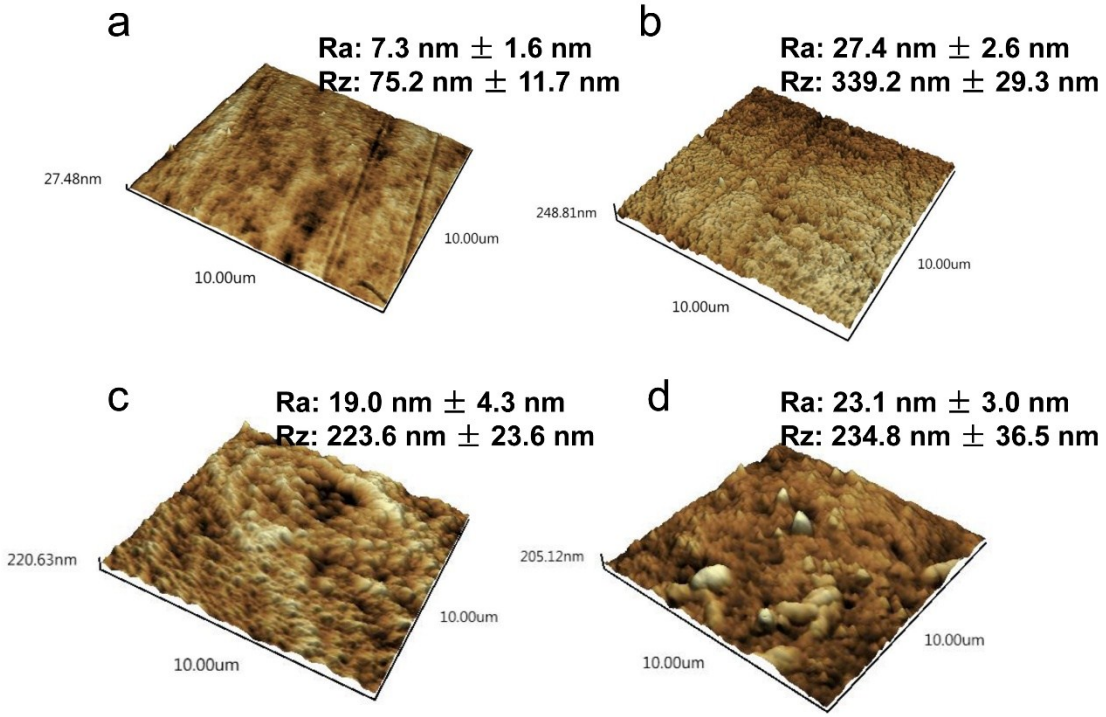

Figure S8. AFM images of (a) intact enamel surface, (b) acid-etched enamel surface, (c) Peptide-7 treated enamel surface, and (d) NaF treated enamel surface after 8 days of mineralization. Ra indicates the mean roughness (nm) and Rz indicates the maximum height (nm) of the tested surface.

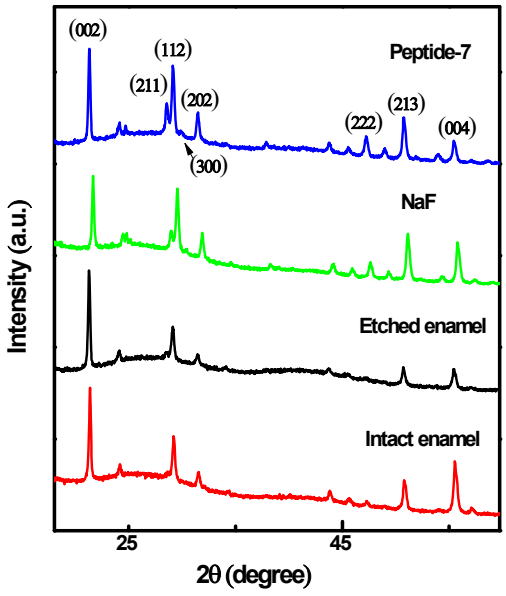

Figure S9. XRD patterns of the intact tooth enamel, acid-etched enamel, Peptide-7 treated enamel, and NaF treated enamel after 8 days of mineralization.

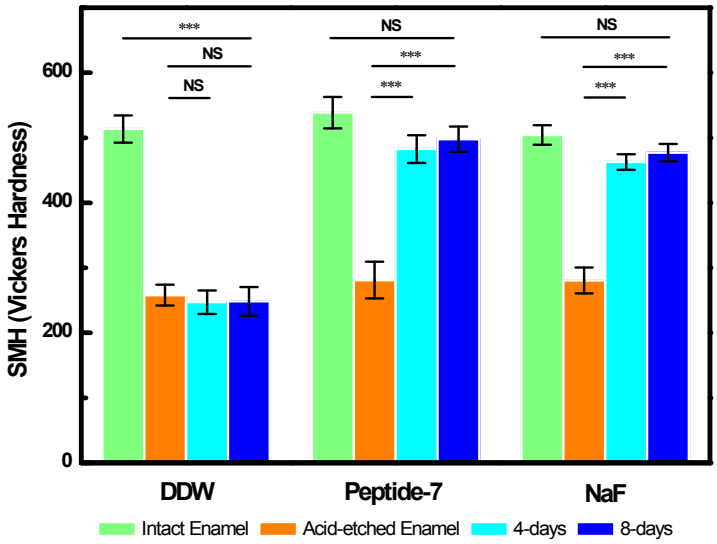

Figure S10. The surface micro-hardness (Vickers hardness) of DDW, Peptide-7, and NaF treated enamels after being soaked in artificial saliva for 4 days and 8 days, compared with the micro-hardness values of the original and acid-etched tooth enamel surfaces. ***, $p < 0.005$; NS, no significant difference

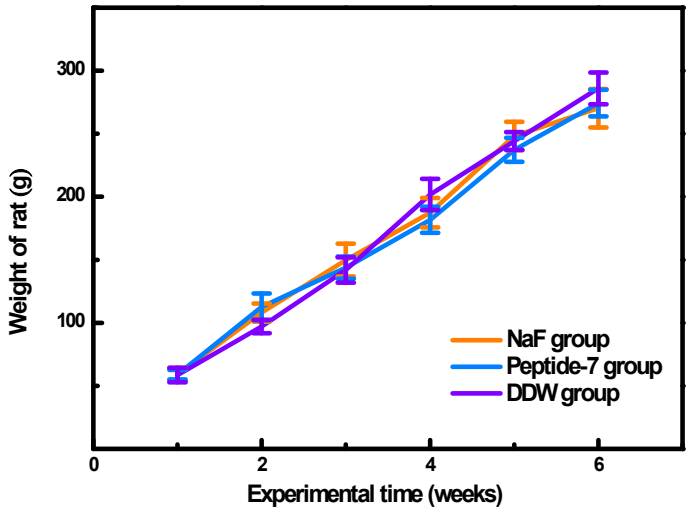

Figure S11. Weight changes in Sprague-Dawley rats infected with *S.mutans* during the treatment period, whose molars were subsequently treated with distilled and deionized water (DDW), NaF, and Peptide-7. The mean ± standard deviation values calculated from 6 animals per treatment group are shown. The weights of the rats were similar in all the groups throughout the treatment period.