Electronic Supplementary Material (ESI) for Nanoscale.

Unraveling dominant surface physicochemistry to build antimicrobial peptide coatings with supramolecular amphiphiles

Zhou Ye[†], *Alexandra Kobe*[†], *Ting Sang*[†,‡], *Conrado Aparicio*[†,*]

[†] MDRCBB, Minnesota Dental Research Center for Biomaterials and Biomechanics, University of Minnesota, Minneapolis, Minnesota 55455, United States

[‡] The Affiliated Stomatological Hospital of Nanchang University & The Key Laboratory of Oral Biomedicine, Nanchang, Jiangxi Province 330006, China

[*] Corresponding author: apari003@umn.edu

Supplementary Figures

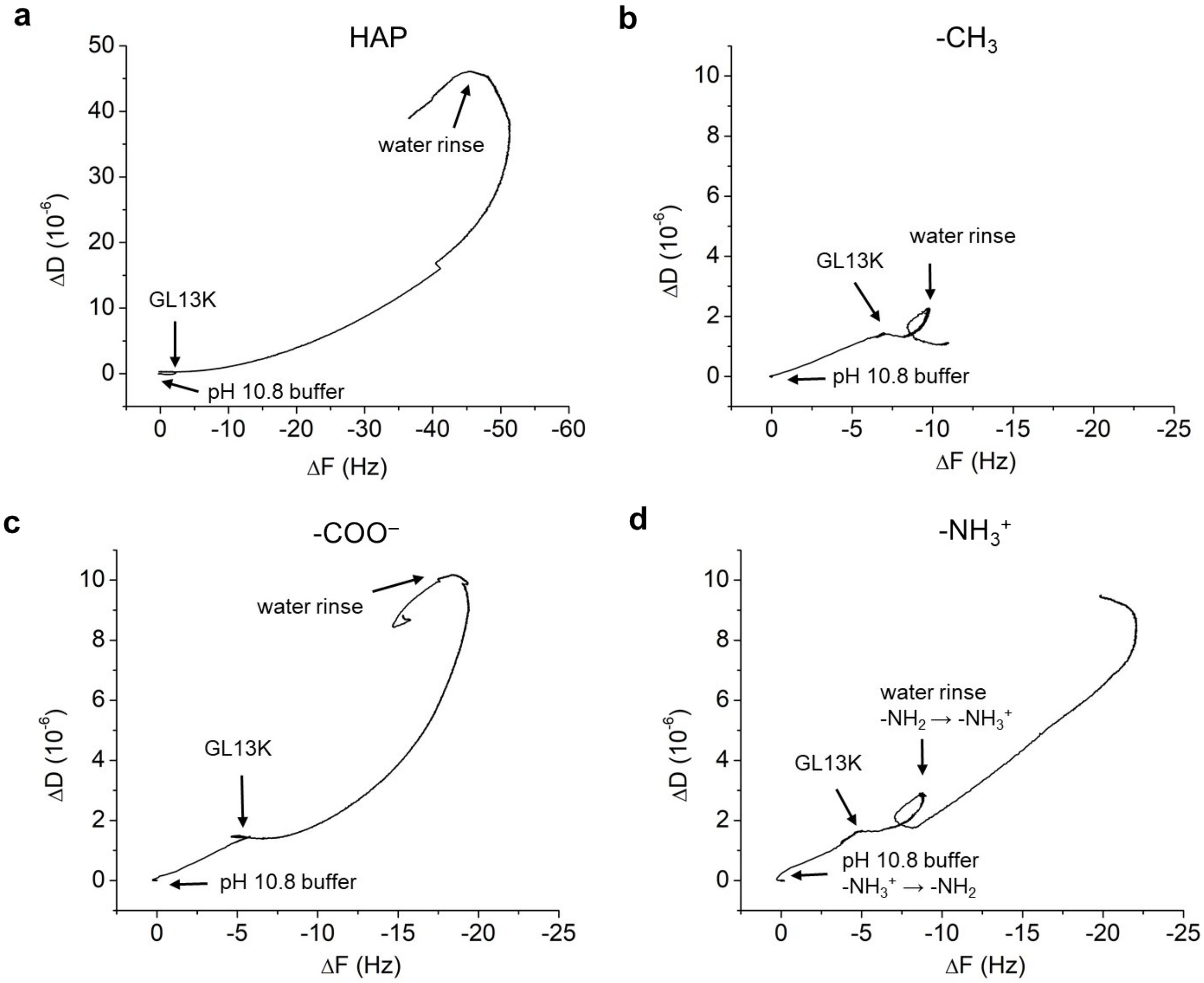

Figure S1. Relationship between change of dissipation (ΔD) and change of frequency (ΔF) by QCM-D monitoring of adsorption of GL13K in the pH 10.8 borax-NaOH buffer solution on (a) HAP-coated sensors and SAM-coated Au sensors with (b) $-CH_3$, (c) $-COO^-$, and (d) $–NH_3^+$ terminal groups. By eliminating time as an explicit parameter, the viscoelastic properties could be directly explored from the slopes of ΔD/ΔF. A lower ΔD/ΔF value characterizes a rigid layer, whereas a higher ΔD/ΔF value is a signal of a dissipative layer. For GL13K coating on HA-coated sensors (Figure S1a), at the beginning, ΔD/ΔF was almost zero which indicated that the first layer of GL13K was very rigid. When more self-assembled GL13K adsorbed on the HAP-coated sensors, the slopes gradually became steeper with increased mass deposition. For analysis of the adsorption of GL13K on the SAMs-coated sensors, the reader is referred to the main text of the paper.

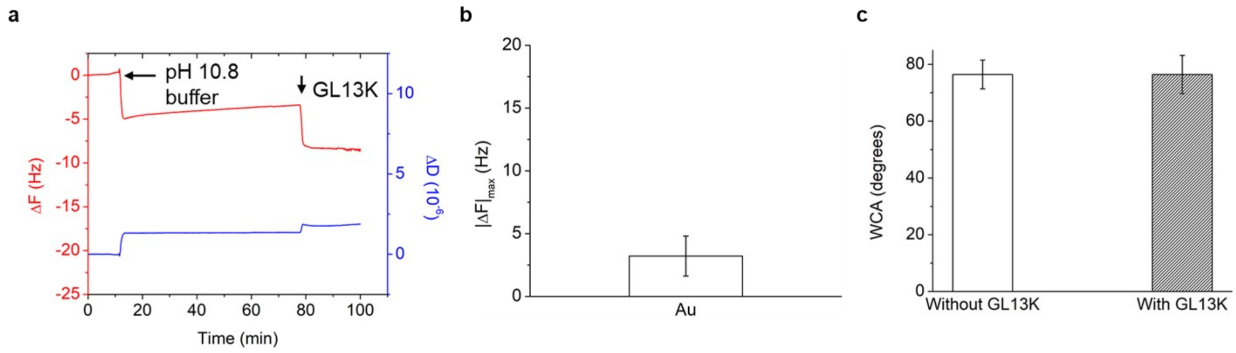

Figure S2. GL13K peptides adsorption on Au sensors: (a) representative QCM-D plots for the monitoring of GL13K adsorption on Au sensor; (b) average frequency change by GL13K adsorption on Au sensor; (c) WCA of Au sensor before and after adsorption of GL13K.

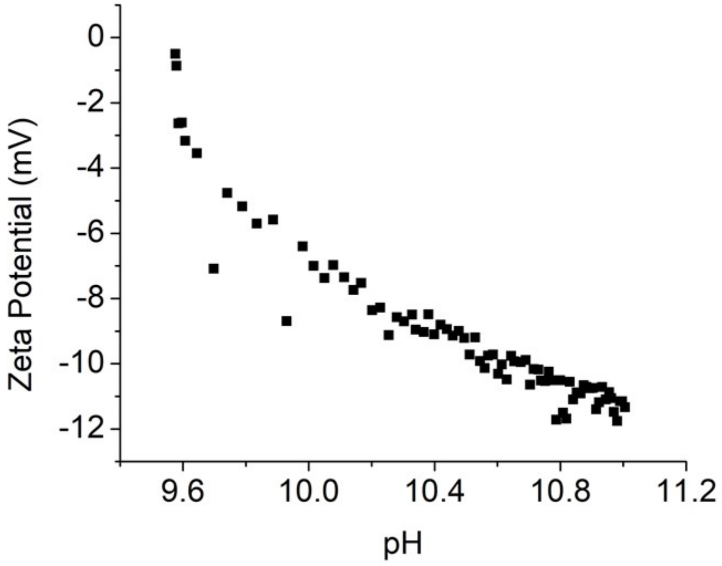

Figure S3. Zeta potential of 0.1 mM GL13K in borax-NaOH buffer at pH 9.6-11.0. The titration was performed with a Zeta potential analyser (Stabino, Particle Metrix, Meerbusch, Germany). 0.1 M NaOH solution was added dynamically (4-20 s dynamic time interval and 2-50 μL NaOH volume to keep $0.1 \leq \Delta pH \leq 0.2$) to pH 11.0. At each step, the pH and zeta potential were recorded.

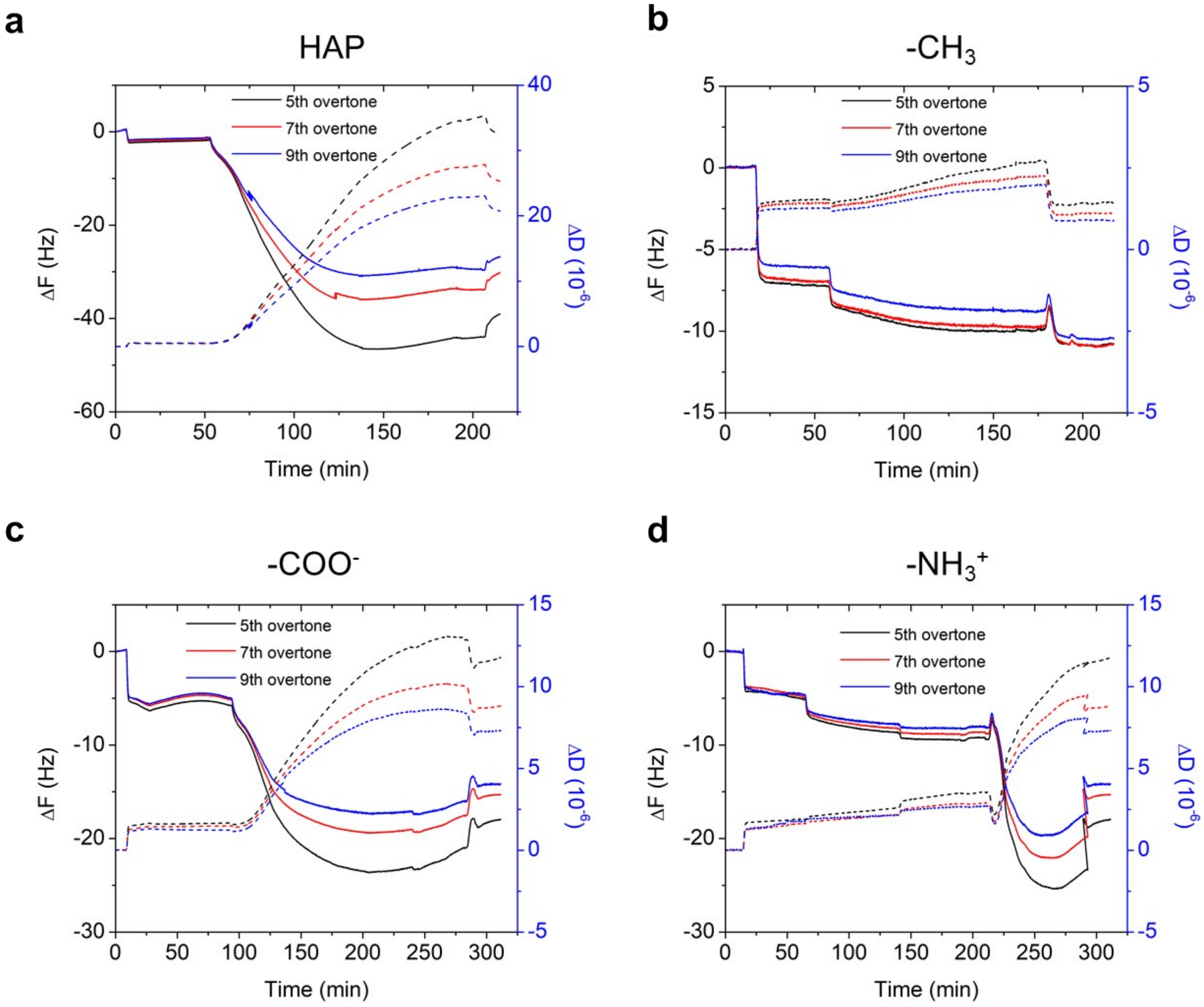

Figure S4. Representative QCM-D plots of the 5th, 7th, and 9th overtone for monitoring GL13K adsorption on (a) HAP, (b) -CH_3, (c) –COO^-, and (d) –NH_3^+ coated sensors. GL13K was in a pH 10.8 borax-NaOH buffer solution. Solid lines: changes of frequency; dash lines: changes of energy dissipation.