

Supporting Information

For

A Highly Conserved Motif within the Amelotin Protein Controls the Surface Growth of Brushite

Menghan Yu,[†] Lijun Wang,^{*,†} Wenjun Zhang,[†] and Bernhard Ganss[‡]

[†]College of Resources and Environment, Huazhong Agricultural University, Wuhan 430070,

China

[‡]Matrix Dynamics Group, University of Toronto, Faculty of Dentistry, Toronto, Ontario M5S 3E2, Canada

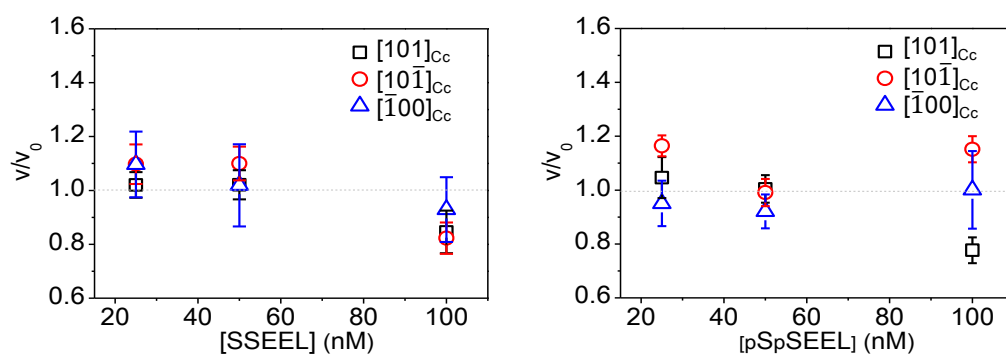


Figure S1. Relative step movement velocities along the $[101\bar{1}]_{Cc}$, $[101]_{Cc}$ and $[100\bar{1}]_{Cc}$ directions as a function of $pSpSEEL$ concentrations at $\sigma = 0.317$.

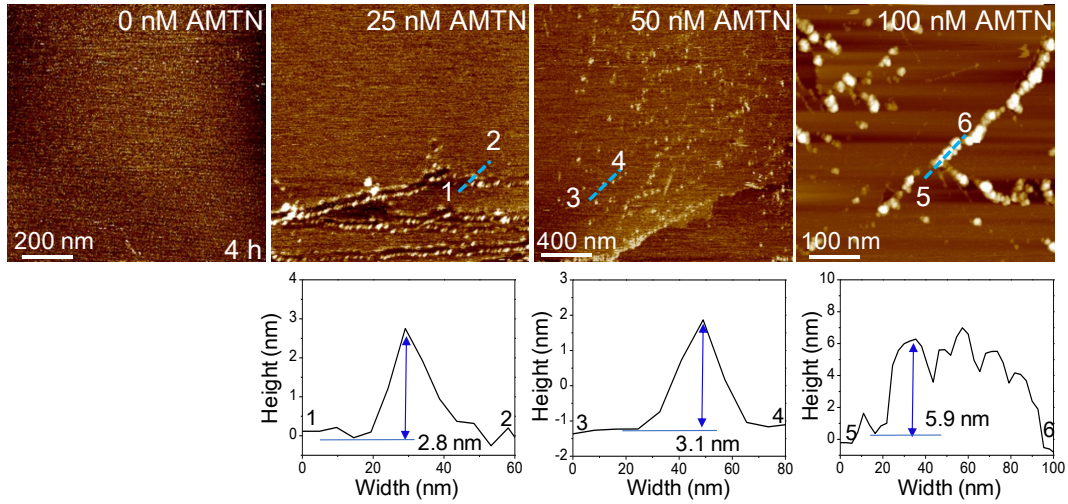


Figure S2. AFM height images showing the sizes (heights) of AMTN nanoparticles measured along lines l_{1-2} , l_{3-4} (about 3 nm), and l_{5-6} (about 6 nm).

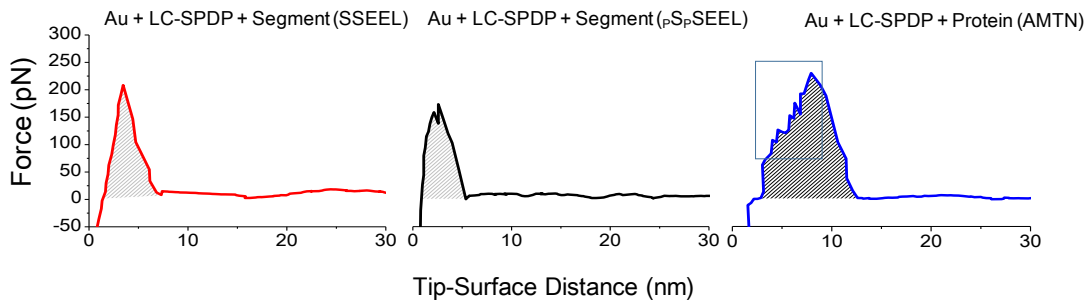


Figure S3. Typical force-distance curves for functionalization with SSEEL, $pSpSEEL$, and AMTN at reverse velocity of 1120 nm/s. A rectangle demonstrates the major interaction sites on mineral surfaces. The hatched region indicates the work, W , measured upon moving the cantilever tip from the DCPD surface to the minimum of the pulling potential.

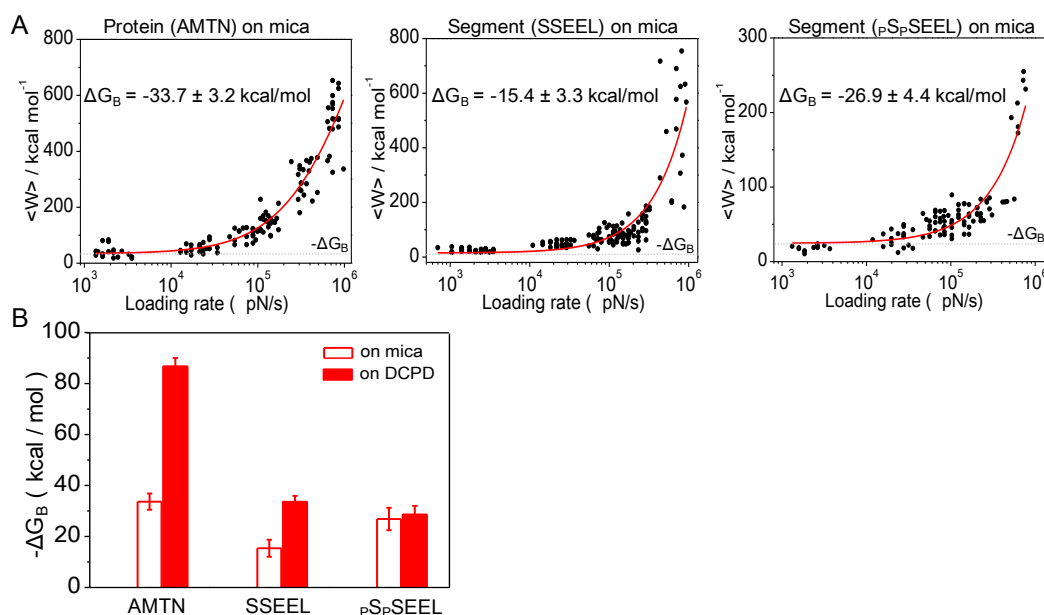


Figure S4. (A) Dynamic work measured from repeated force-distance trajectories for an AMTN protein-, SSEEL segment-, and pSpSEEL segment- functionalized tip from the mica (solid black circles). Red solid curve is a fit to a two-state theoretical model. The work tends asymptotically to a finite value given by the free-energy difference (dashed gray line), ΔG_B of -33.67 ± 3.17 , -15.4 ± 3.34 , and -26.86 ± 4.41 kcal mol⁻¹, respectively. (B) The comparisons of the binding free-energy of AMTN and two peptide segments on DPCD or mica.

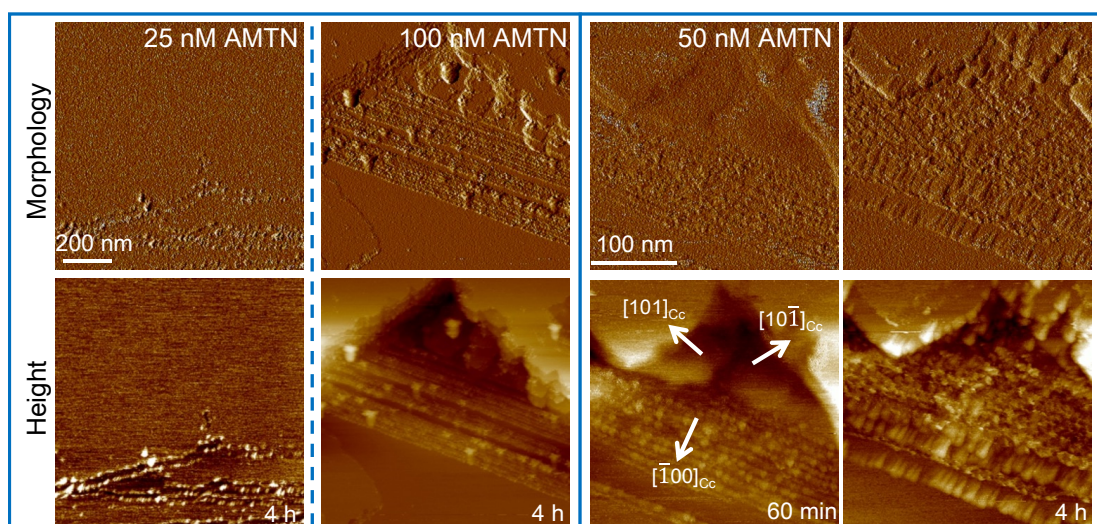


Figure S5. Representative AFM deflection and height images showing that particles are attached on the DCPD (010) surface after 4 h of injecting a slightly saturated solution having 25, 50, and 100 nM AMTN at room temperature.

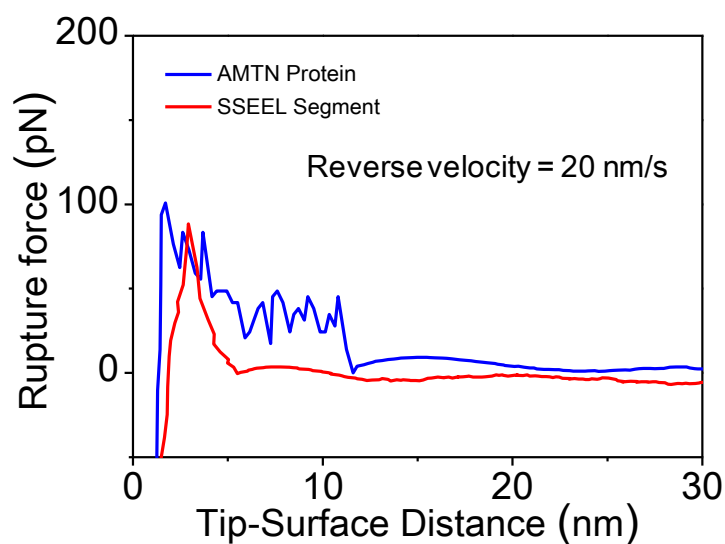


Figure S6. (A) Typical force curves for an AMTN protein and a SSEEL peptide showing the similar rupture forces from the DCPD surface but difference in distance at reverse velocity of 20 nm/s.