Supporting Information for

Facet-Specific Mineralization Behavior of nano-CaP on Anatase Polyhedral Microcrystals

Guohui Shou, Lingqing Dong, Zongguang Liu, Kui Cheng, Wenjian Weng*

School of Materials Science and Engineering, State Key Laboratory of Silicon Materials, Zhejiang University, Hangzhou 310027, China

* E-mail address: wengwj@zju.edu.cn

The decahedron anatase TiO_2 polyhedral microcrystals (AN-TMCs) with {001} and {101} facets exposed were obtained by a hydrothermal synthesis process. For a typical experiment, 0.025 g of Ti powders, 250 μL HF and 7.50 mL of H_2O_2 were mixed with deionized water. Then the solution was put into a dried Teflon-lined stainless steel autoclave. And the autoclave was sealed and heated at 180 ^{o}C for 10 h in an electric oven. The product as the precipitate at the boom was washed thoroughly with deionized water for three times to remove the residual contamination. And then the product was dried at 60 ^{o}C for 6 h. All of them were put into Muffle furnace for heat-treatment at 520 ^{o}C for 60 min in order to remove fluorine element on AN-TMCs.

The phase of AN-TMCs was determined by X-ray diffraction (XRD) analysis (PANalytical, X'Pert PRO, Cu-Kα). Surface chemical composition of AN-TMCs was characterized by an X-ray photoelectron spectroscopy (XPS, Kratos AXIS Ultra DLD). The microstructures of AN-TMCs and the resulting surfaces were characterized by a scanning electron microscopy (SEM, Hitachi, SU-70) and transmission electron microscopy (TEM, Philips Tecnai F20). In order to facilitate the experiment, AN-TMCs were attached to silicon substrates by spin coating. In order to study the mineralization of nano-CaP on AN-TMCs, AN-TMCs were soaking in fetal bovine serum (FBS), Alpha-minimum essential medium (αMEM, gibco, 1x), complete cell culture medium (10% FBS, 90% αMEM and essential element) at 37 ^{o}C for 12 h, and in αMEM at 37 ^{o}C for 12 h after FBS preadsorbed at 37 ^{o}C for 6 h. All samples were placed vertically in the centrifuge tubes, the volume of all the solutions added into centrifuge tubes was 1 ml, and all centrifuge tubes were put into an electric oven for thermal insulation. Between soaking in αMEM and FBS, AN-TMCs were washed by deionized water, and dried at 37 ^{o}C in an electric oven. After soaked, AN-TMCs were washed with deionized water, and the dried at 37 ^{o}C in an electric oven. Then, AN-TMCs after soaking were evaluated by SEM and XPS. AN-TPMCs under Ultraviolet light (UV) 254 nm illumination for 1 h, and then were soaked in FBS protein solution at 37 ^{o}C for 6 h, washed by deionized water and dried at 37 ^{o}C in an electric oven,

then, they were soaked in αMEM for 12 h at 37 ^{o}C. TEM and EDS line scanning were used to observe the deposits on AN-TMCs. Fourier transform infrared spectroscopy (FTIR) absorbance spectrum of AN-TMCs after soaking in FBS protein solution to further confirm the adsorption of proteins on them.

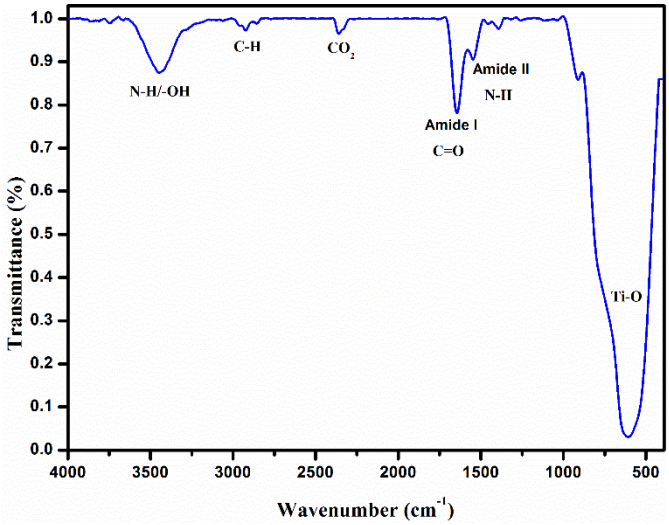

Figure S1. The FTIR spectrum of AN-TPMCs after soaking in FBS proteins solution at 37 ^{o}C for 6 h.

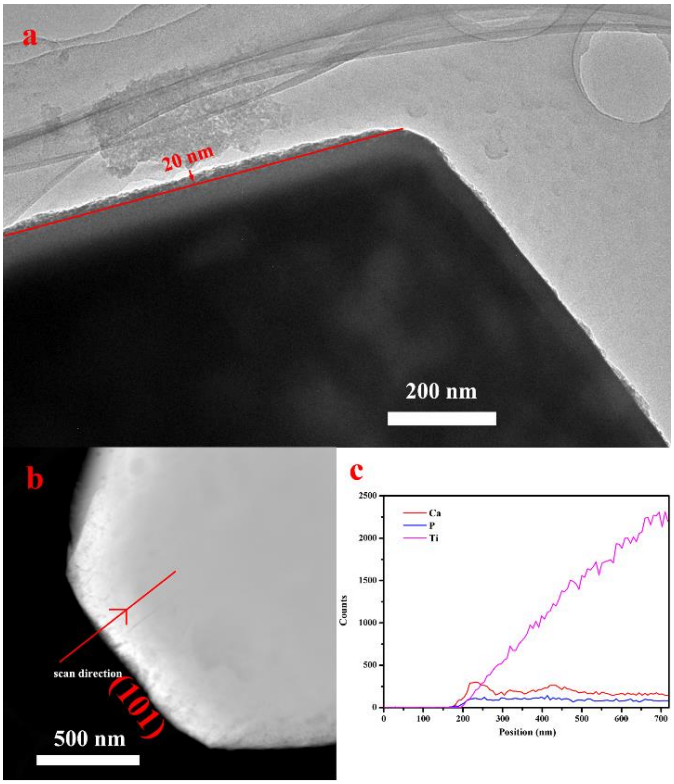

Figure S2. TEM (a), EDS analyses (b and c) of CaP deposited on a typical individual AN-TPMC soaked in αMEM at 37 ^{o}C for 12 h after FBS preadsorbed at 37 ^{o}C for 6 h.

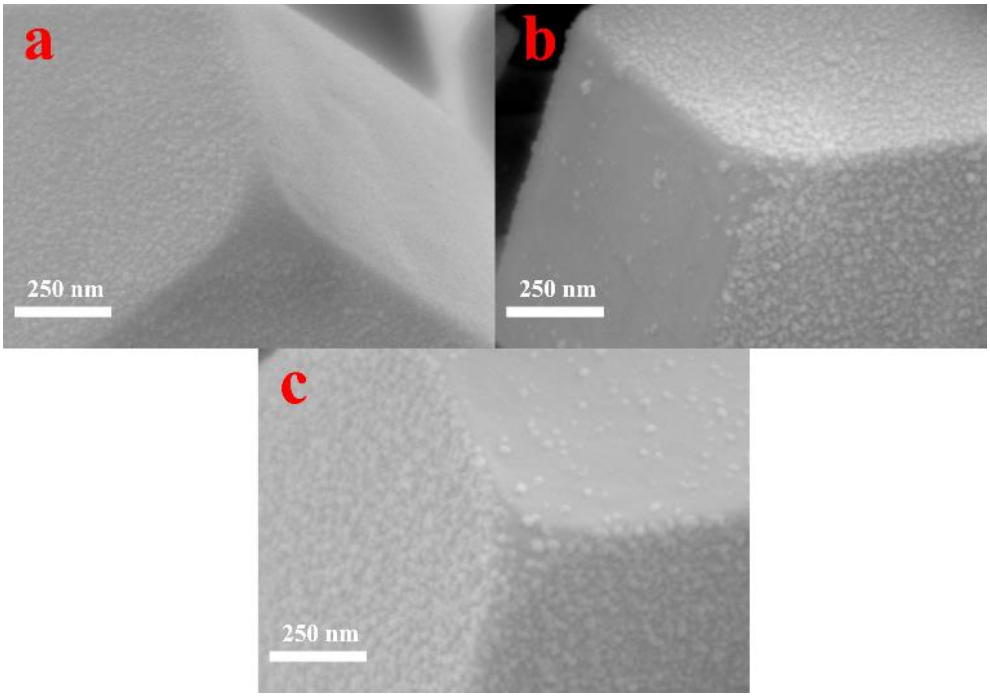

Figure S3. High-magnification SEM images of the mineralization of CaP on AN-TPMCs after soaking in FBS protein solution at 37 ^{o}C for 24 h (a), 36 h (b) and 48 h (c).