

Electronic Supplementary Information

Microbubbles trigger oscillation of crystal size in solids

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1. Crystallographic parameter such as crystallite size was calculated using Scherrer approach.

Scherrer method relies on utilizing the following equation:

$$D = \frac{k \lambda}{\beta_D \cos \theta}$$

where k is shape factor (a constant equals to 0.94), λ is the X-ray wavelength (1.54056 Å for CuK $_{\alpha}$ radiation), β_D is the instrumental corrected peak width at half-maximum intensity, θ is the peak position, and D is the effective crystallite size normalized to the reflecting planes.

For the calculations we used the peak at 38.5° (110), that was assigned to (110) Ti (JCPDS: 00-044-1288).

2. The fitting parameters of each curve in **Figure 4D** are presented in Table S1.

Table S1: Fitting parameters of reduced lognormal crystal size distributions of untreated and HIUS treated Ti in ethylene glycol for 1 min, 5 min, and 10 min as shown in **Figure 4D**.

Sample	C ₀	C ₁	C ₂	C ₃
untreated	-0.0086	1	0.8772	0.4166
1 min	-0.0477	1	0.8306	0.4126
5 min	-0.0795	0.9948	0.7295	0.7966
10 min	-0.0134	0.9649	0.8346	0.5168

3. Fourier-transformed infrared spectroscopy (FTIR) and X-ray photoelectron spectroscopy (XPS) studies of Ti layer surfaces shown in **Figure S1** and **Figure S2** reveal the presence of titanium dioxide species. The IR-bands (**Figure S1**) at around 500 to 1000 cm^{-1} are attributed to TiO_2 stretching. Bands at around 1000 to 1500 cm^{-1} can be assigned to Ti-O-Ti stretching an vibration while bands at around 1600 cm^{-1} and 3000 to 3500 cm^{-1} can be attributed to OH-groups.^{1,2,3} As we see in **Figure S1**, surface composition of the samples did not significantly change upon sonication.

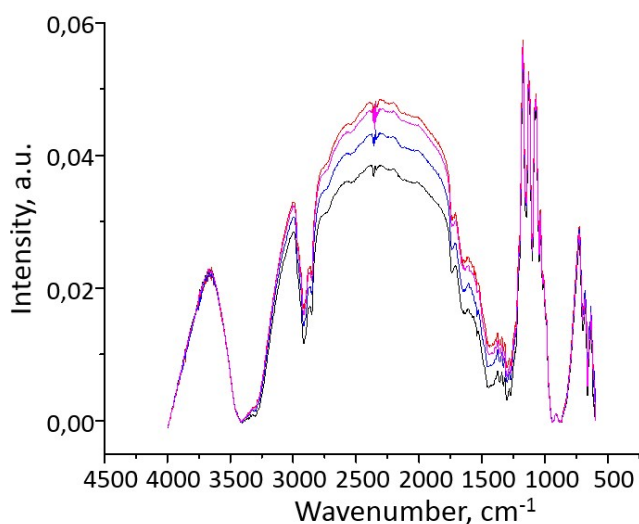


Figure S1: FTIR spectra of initial (black) and HIUS treated Ti surfaces for 1 (red), 5 (blue), and 10 (pink) min.

XPS studies of Ti layer surfaces reveal the presence of the picks of $\text{Ti}2p$ and $\text{O}1s$ (Figure S2). This data demonstrate that the surface of the layers is formed by the metal oxide phases. We did not reveal any significant changes in surface composition of the samples after ultrasonic treatment in ethylene glycol.

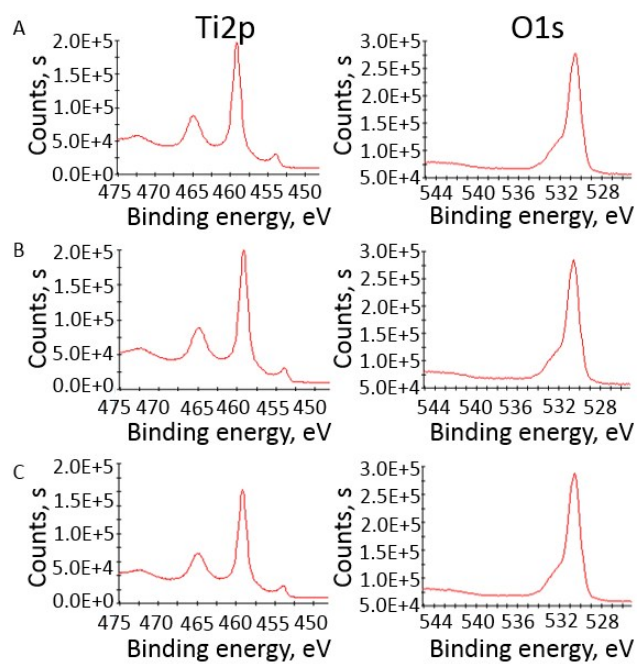


Figure S2: XPS spectra of initial (A) and HIUS treated Ti surfaces for 1 (B), and 5 min (C).

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