

Supporting Information

Adsorption of SARS-CoV-2 Spike Protein S1 at Oxide Surfaces Studied by High-Speed Atomic Force Microscopy

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HS-AFM images of the pristine $\text{Al}_2\text{O}_3(0001)$ and $\text{TiO}_2(100)$ surfaces

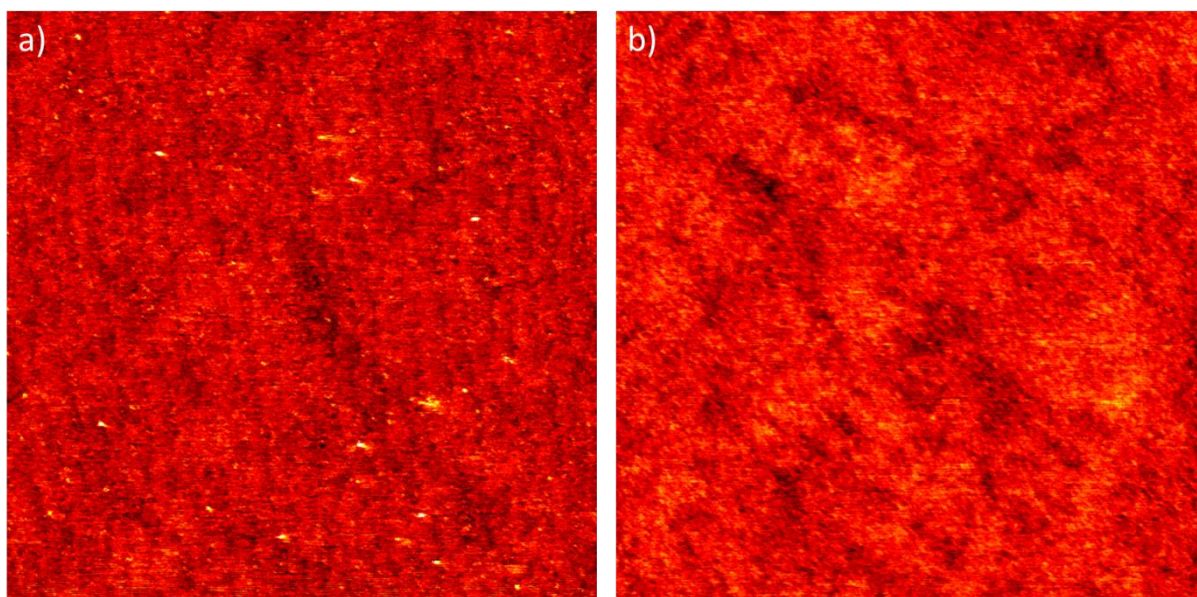


Figure S1. HS-AFM images of an $\text{Al}_2\text{O}_3(0001)$ (a) and a $\text{TiO}_2(100)$ substrate (b) in 10 mM Tris (pH 7.5) without proteins. The images have a size of $1 \times 1 \mu\text{m}^2$ and a height scale of 2 nm.

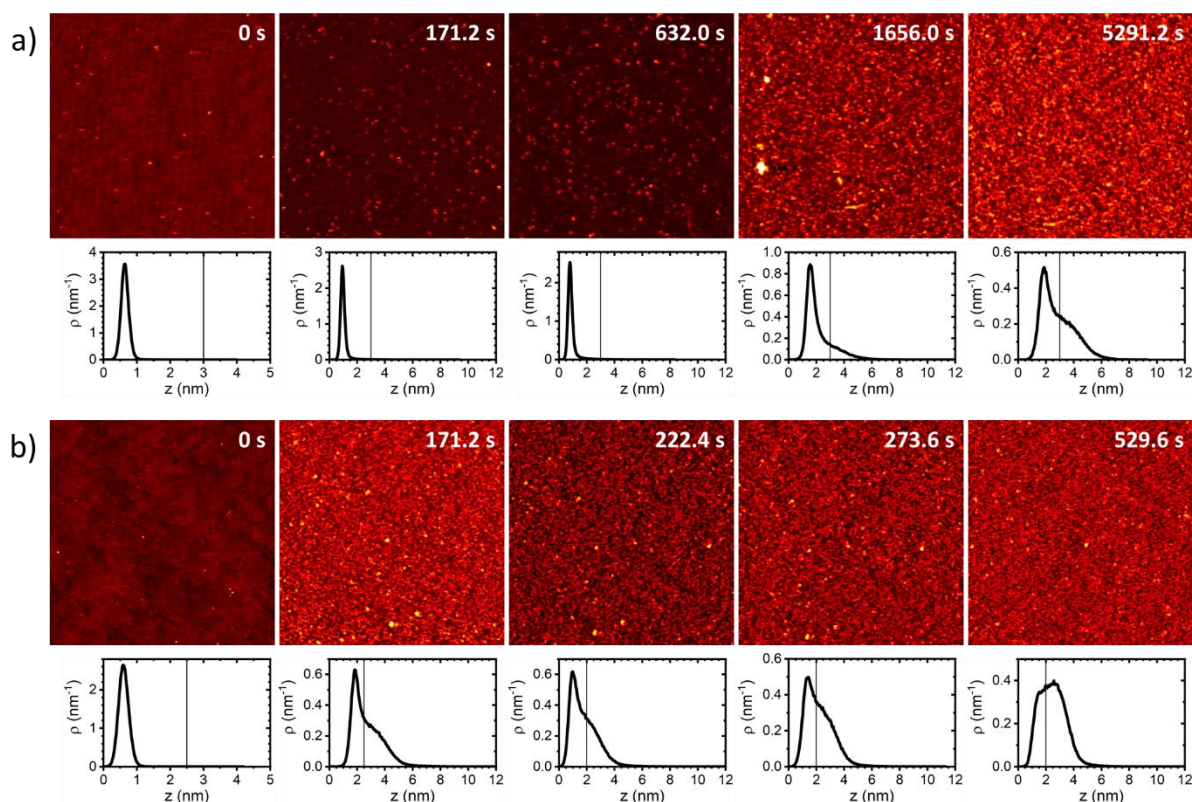
Additional AFM images and height distribution functions

Figure S2. HS-AFM images ($1 \times 1 \mu\text{m}^2$) of SARS-CoV-2 spike protein S1 in 10 mM Tris (pH 7.5) with 165 mM NaCl adsorbed to (a) an Al₂O₃(0001) and (b) a TiO₂(100) surface recorded at different time points as indicated. Height scales are 5 nm for the clean substrate surfaces at 0 s and 12 nm for the protein covered surfaces at later time points. Below the HS-AFM images, the corresponding height distribution functions are depicted. The vertical lines in the plots represents the height thresholds applied in the statistical analyses.

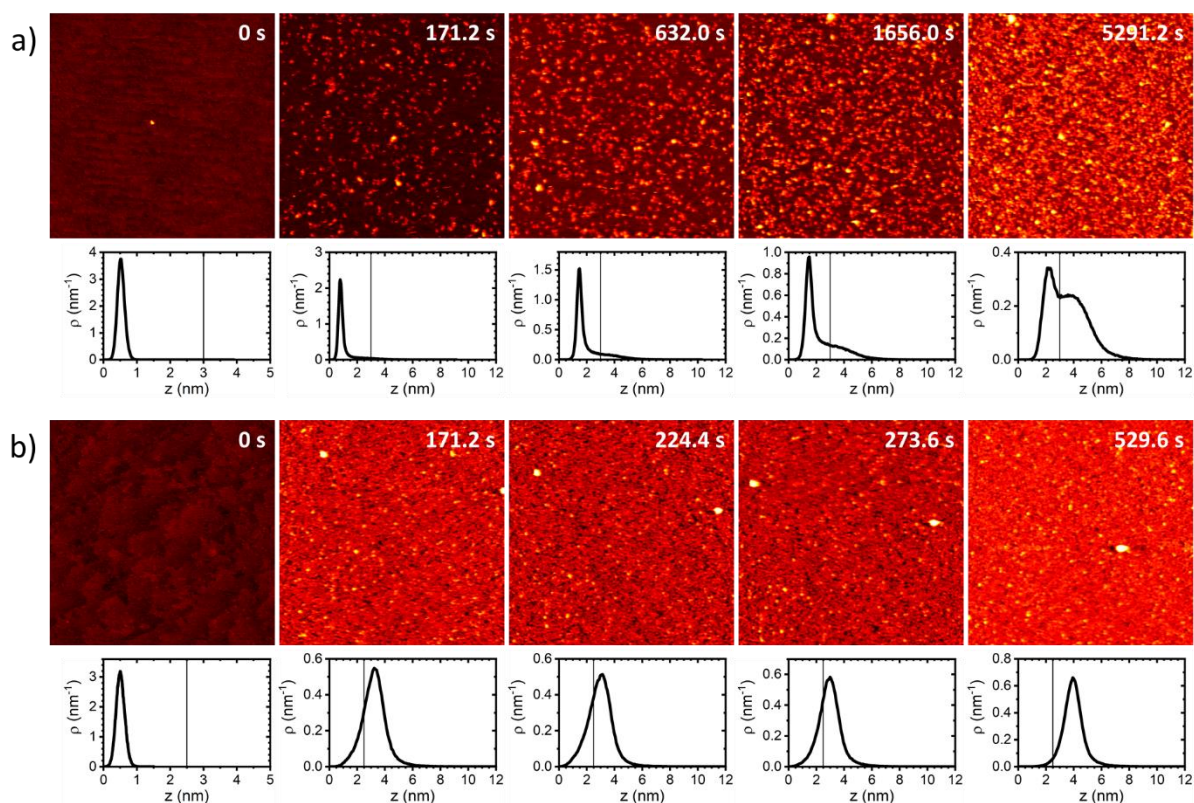


Figure S3. HS-AFM images ($1 \times 1 \mu\text{m}^2$) of SARS-CoV-2 spike protein S1 in 10 mM Tris (pH 7.0) with 30 mM KCl and 15 mM NaCl adsorbed to (a) an Al₂O₃(0001) and (b) a TiO₂(100) surface recorded at different time points as indicated. Height scales are 5 nm for the clean substrate surfaces at 0 s and 12 nm for the protein covered surfaces at later time points. Below the HS-AFM images, the corresponding height distribution functions are depicted. The vertical lines in the plots represents the height thresholds applied in the statistical analyses.

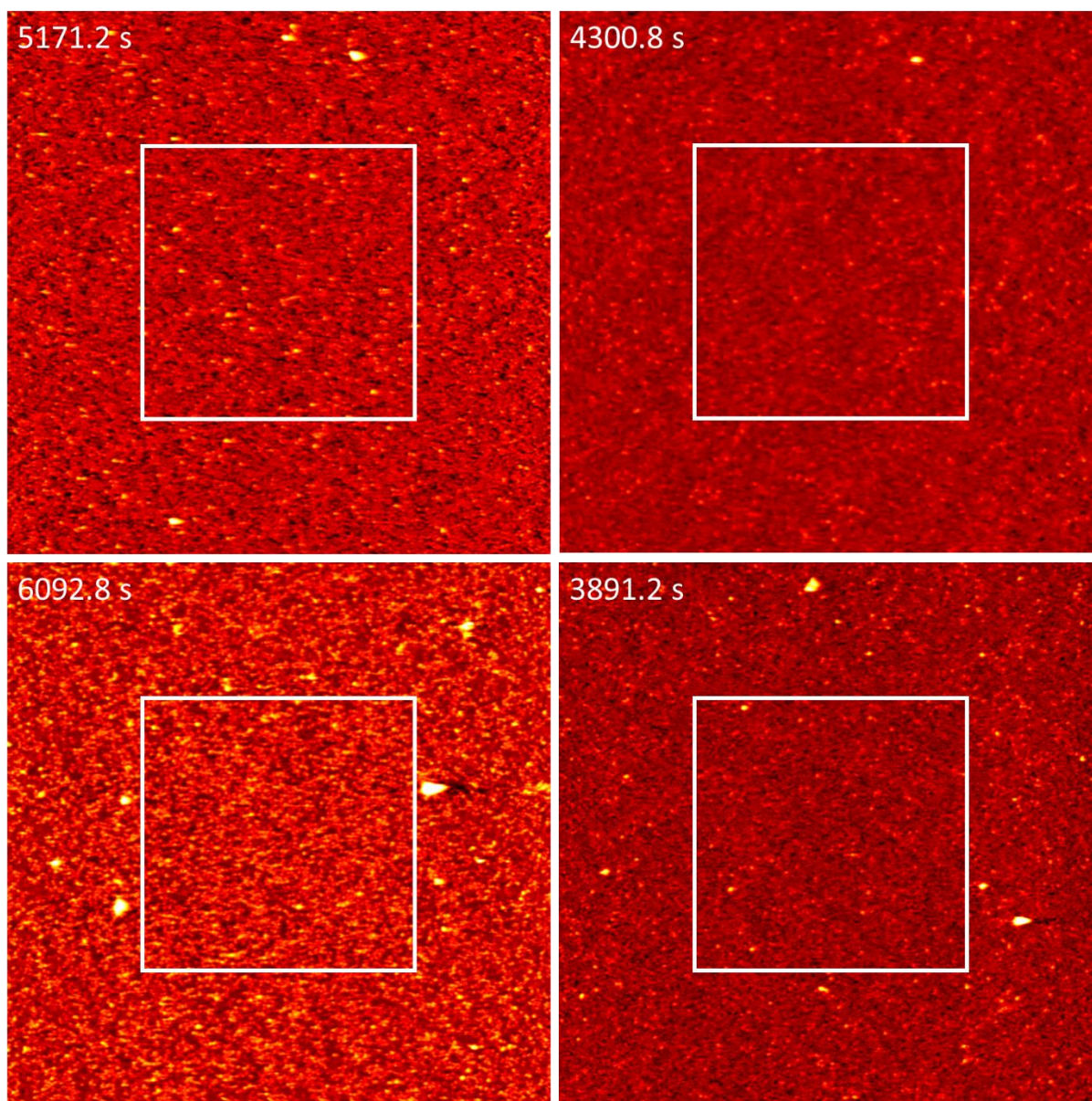
Evaluation of tip effects

Figure S4. Zoomed-out HS-AFM images recorded after protein adsorption at $\text{Al}_2\text{O}_3(0001)$ (left) and $\text{TiO}_2(100)$ surfaces (right) in 10 mM Tris (pH 7.5) with (lower row) and without 165 mM NaCl (upper row). The images have a size of $2 \times 2 \mu\text{m}^2$ and a height scale of 12 nm. The white squares indicate the $1 \times 1 \mu\text{m}^2$ areas that have been continuously scanned during the experiments for the times indicated in the images. In neither image, an influence of the scanned tip can be noticed.