

Supplementary Information for

## Condensing Water Vapor to Droplets Generates Hydrogen Peroxide

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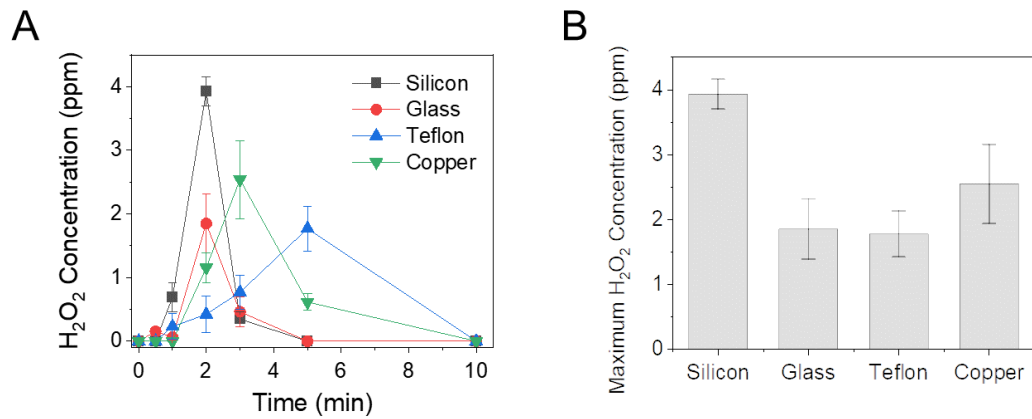
Email: [fprinz@stanford.edu](mailto:fprinz@stanford.edu)

### This PDF file includes:

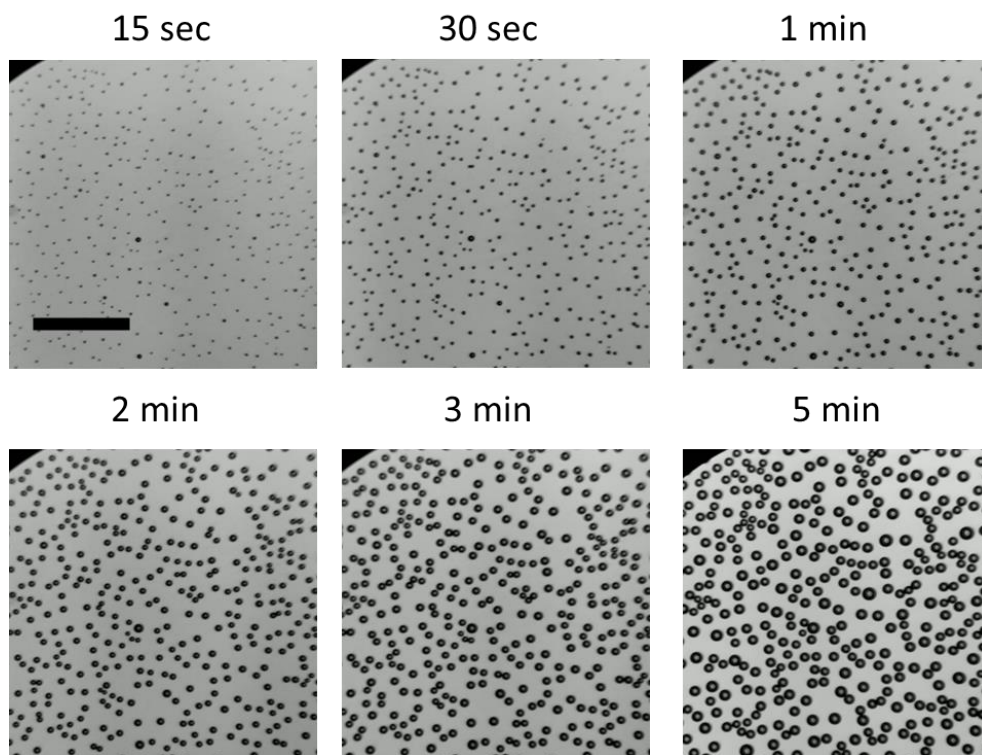
Figures S1 to S6  
Legend for Movie S1

### Other supplementary materials for this manuscript include the following:

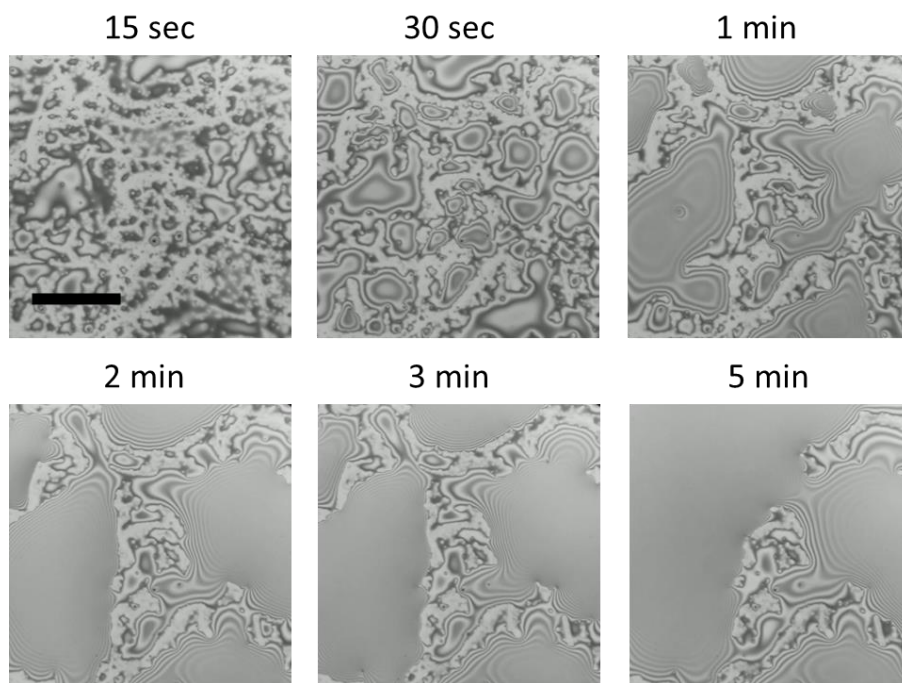
Movie S1



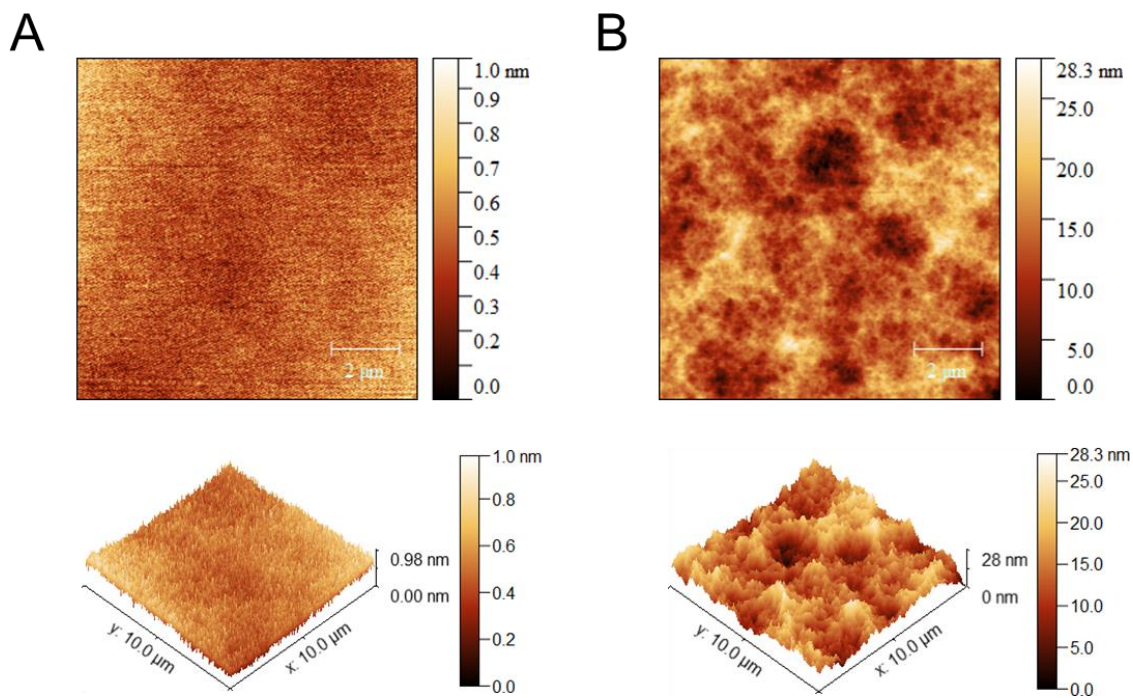
**Fig. S1.** The dependence of H<sub>2</sub>O<sub>2</sub> production yield on types of materials. (A) Time course of H<sub>2</sub>O<sub>2</sub> concentration in water microdroplets collected from silicon (Si) wafers, slide glasses, Teflon sheets, and polished copper. (B) Maximum H<sub>2</sub>O<sub>2</sub> concentration for each surface material. Error bars represent one standard deviation from three independent measurements.



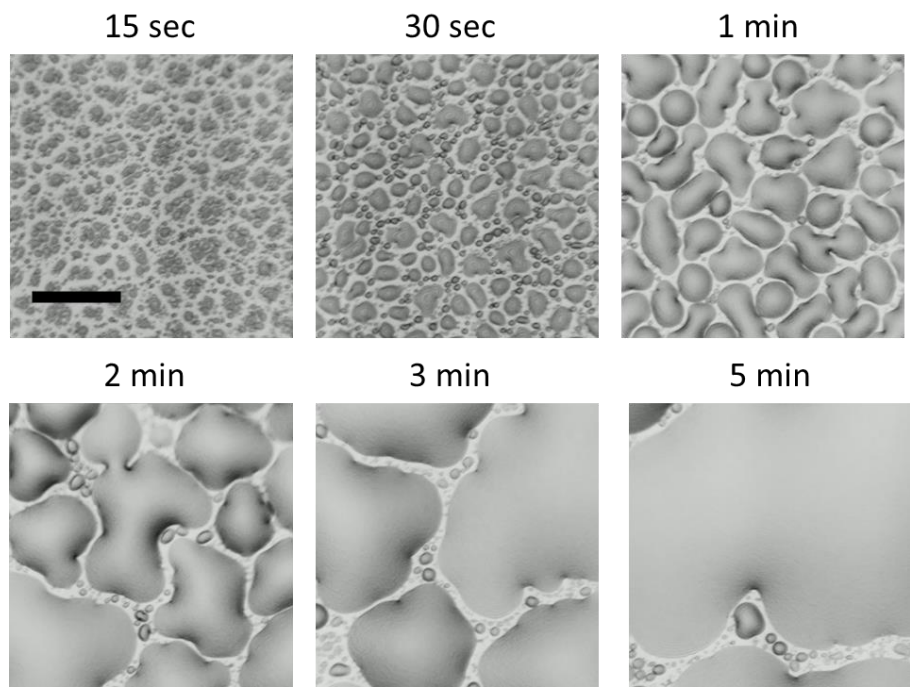
**Fig. S2.** Time-lapse brightfield images of water condensation on hydrophobic-treated Si surfaces. Scale bar, 50  $\mu\text{m}$ .



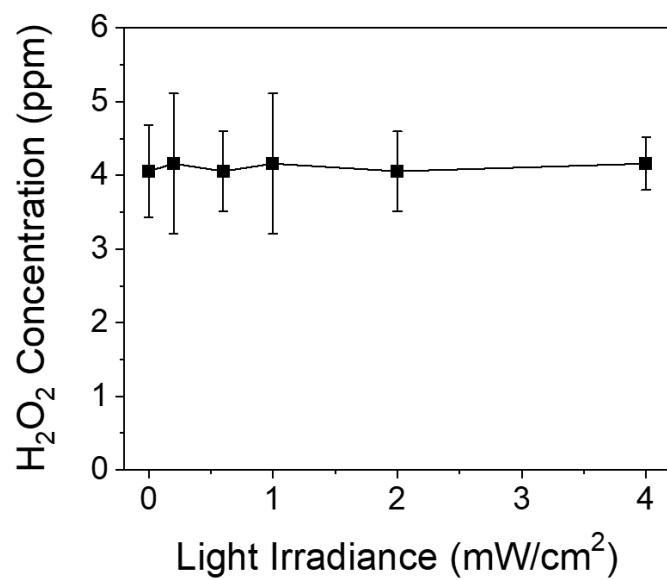
**Fig. S3.** Time-lapse brightfield images of water condensation on hydrophilic-treated Si surfaces. Scale bar, 50  $\mu\text{m}$ .



**Fig. S4.** AFM images of (A) an untreated silicon surface and (B) a deep reactive-ion etched Si surface. Root mean square (RMS) surface roughness was 0.12 nm for (A) and 3.80 nm for (B). Scale bar, 2 μm.



**Fig. S5.** Time-lapse brightfield images of water condensation on a deep reactive-ion etched Si surface. Scale bar, 50  $\mu\text{m}$ .



**Fig. S6.** The effect of the irradiance of visible light ( 400 – 700 nm) on the production of H<sub>2</sub>O<sub>2</sub> from condensed water microdroplets on untreated Si wafers. The surface temperature and the relative humidity were fixed at 3.5 °C and 50%. The typical irradiance by fluorescent room lights used in experiments was approximately 0.2 mW/cm<sup>2</sup> over this wavelength range.

**Movie S1 (separate file).**

A video showing the spontaneous generation of hydrogen peroxide in microdroplets condensed from water vapor on a silicon wafer mounted on a Peltier cooler. The wafer surface temperature and the relative humidity were maintained at 3.5 °C and 55%. The color change of the test strip from white to blue indicates the production of hydrogen peroxide.