Trapping Nitric Oxide by Surface Hydroxyls on Rutile $TiO_2(110)$

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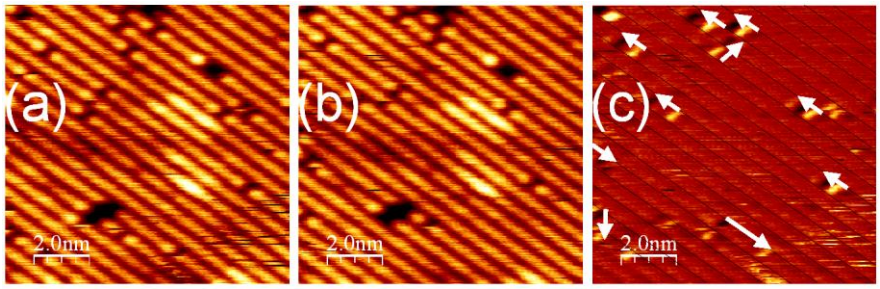

Figure S1. (a, b) Two consecutive STM images (10 nm × 10 nm, I = 0.2 A, V = +1.7 V), take with time interval of 2 min. (c) Difference image obtained by subtracting (a) from (b). White arrows show the motion of the NO-related adsorbate.

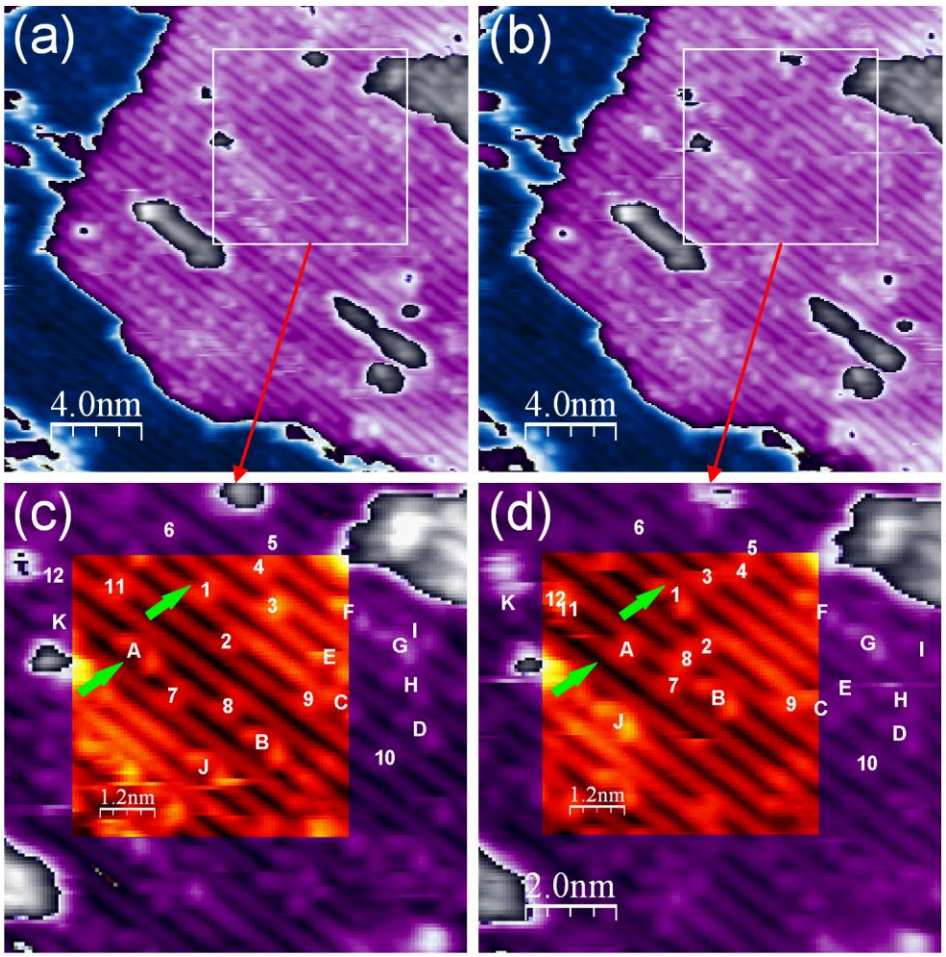

Figure S2. (a, b) Large-area scans corresponding to the STM images shown in Figure 2a and 2b in the main text. (c,d) Zoom-in images of the selected area in (a,b). The area displayed in Figure 2a and 2b is shown in red-color scale; the rest of the images are displayed in purple/gray scale. Letters A to K mark the NO-related adsorbates and numbers 1 to 12 hydroxyls. Each hydroxyl and NO-related feature is accounted for in both images, except for "A" and "1", which represent a disappeared NO-related adsorbate and an appeared hydroxyl, respectively. Movie S1 is composed of images (c) and (d), and shows how the tracking of these adsorbates are performed.

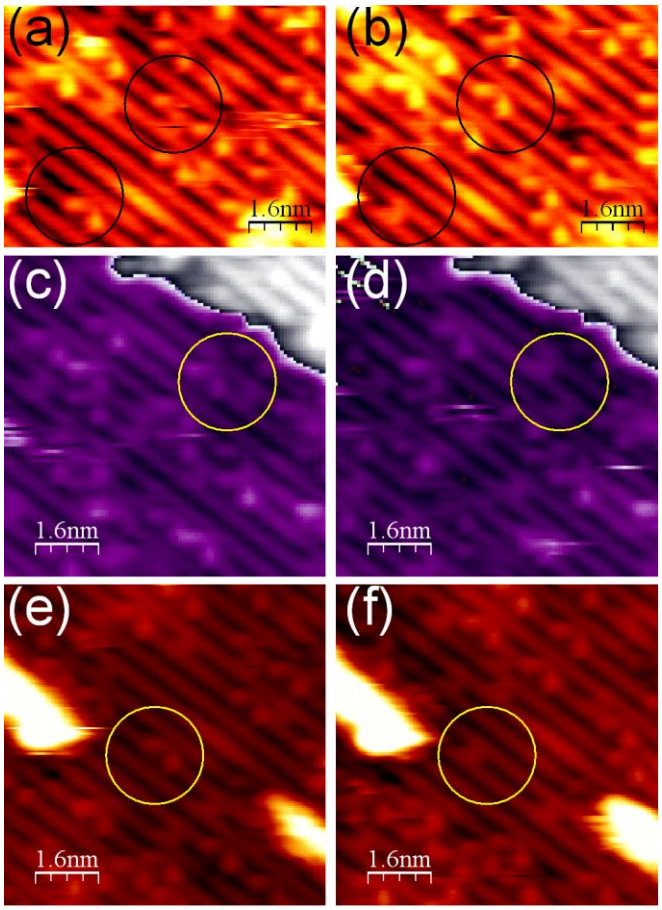

Figure S3. Three examples of simultaneous ad/desorption of an NO-related complex and an OH group. The time interval between two consecutive images is 2 min. V_{sample} = +1.6V and I_{tunnel} = 0.2 nA

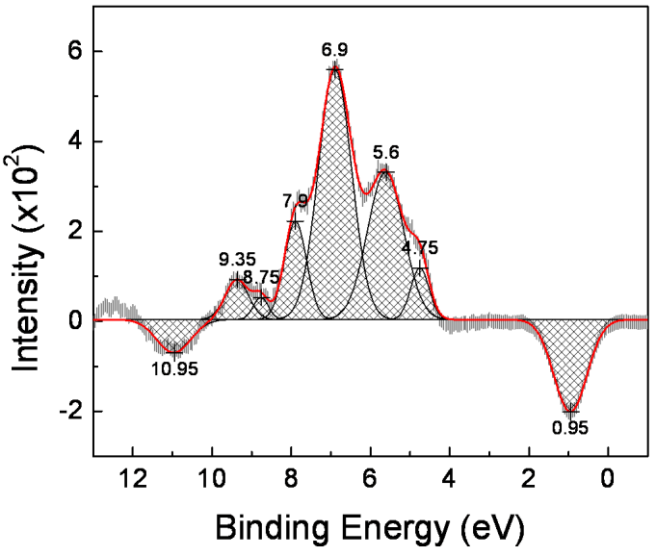

Figure S4. The difference spectrum from Figure 2a. Negative values represents peaks that are decreased upon NO adsorption (i.e., the Ti3+ state at 0.9 eV and the OH 3σ state at 10.9 eV). The positive values show states that appear in the valence band upon NO exposure, these are fitted with with six Gaussians.

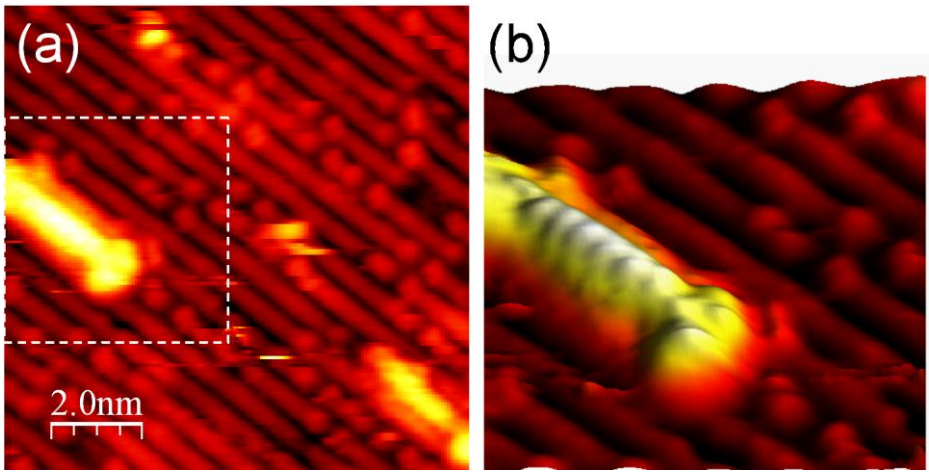

Figure S5. (a) STM image (10 nm × 10 nm) showing a Ti_2O_3 strip and NO-related adsorbates. (b) 3D rendering of the white square area in (a).

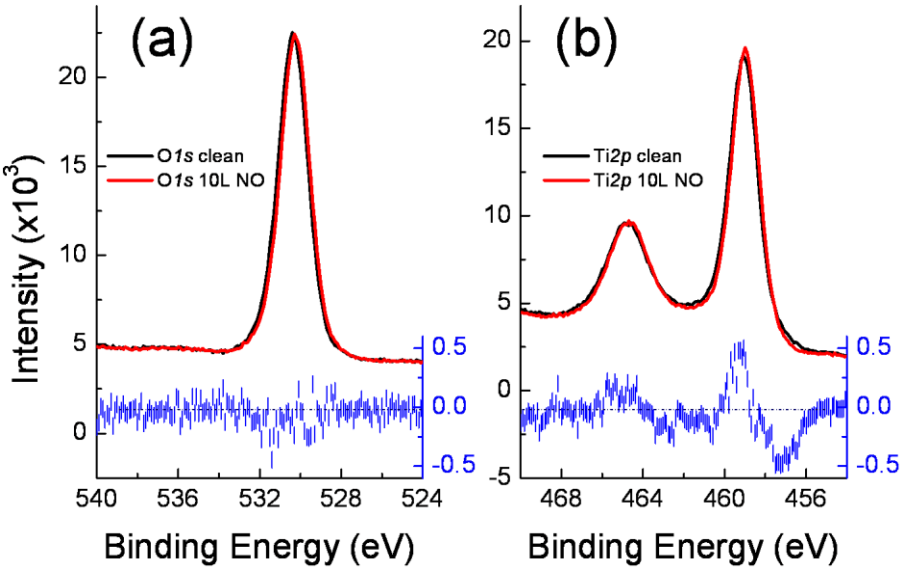

Figure S6. O*1s* (a) and Ti *2p* (b) X-ray photoemission spectra of a hydroxylated TiO_2(110) surface (black) and the surface after dosing NO (red). The blue scatter plots were obtained by subtracting the clean from the NO-exposed spectrum after aligning the peaks in each case.