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Ultraviolet Induced Disordering of the Rutile TiO₂ (110) Surface DANIEL HENNESSY, MICHAEL PIERCE, KEE-CHUL CHANG, Argonne National Laboratory, SATORU TAKAKUSAGI, KOHEI UOSAKI, Hokkaido University, HOYDOO YOU, Argonne National Laboratory — We present x-ray crystal truncation rod (CTR) data collected on the water/rutile TiO₂ (110) surface before and after ultraviolet illumination. It is known that UV illumination transforms the surface superhydrophilic, with contact angle 0 degrees. [1] The wet, slightly hydrophilic surface of the clean, prepared samples exhibits a laterally ordered water adlayer that disorders under UV illumination. Contact angle measurements (CAM) show the surface exposed to ambient air is slightly hydrophobic, with contact angle 61(5) degrees. The well-protected dry surface is slightly hydrophilic, with contact angle 32(5) degrees. We propose a model based on domain growth of hydrophilic phases with laterally disordered water adatoms, consistent with some previous studies. [2] [1] R. Wang et al, Nature, 388, 431 (1997). [2] K. Hashimoto, H. Irie, and A. Fujishima, Jap J Appl Phys, 44, 8269 (2005).

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