

Supporting Information to

**Plasma Induced Tungsten Doping to TiO₂ Particles for Enhancement
of Photocatalysis under Visible Light**

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Sample preparation for ICP-AES (Thermo SCIENTIFIC, iCAP 6000)

100 mg of resultant TiO_2 nanoparticles was added in the 150 mL of PTFE beaker. Hydrogen peroxide (10 mL, Kanto) and nitric acid (2 mL, Kanto) were added, and heated at 120 °C for 3h. The solution was then cooled to room temperature. 8 mL of nitric acid and 2 mL of hydrofluoric acid (stella-chemifa) were added and heated at 120 °C. After the evaporation of solution until the 3 mL remained, the resultant solution was diluted with 10 mL of 2% nitric acid aqueous solution for ICP-AES measurement. Standard solutions of Ti and W (Wako, atomic absorption spectrometry reagent) were used for the calibration of the equipment.

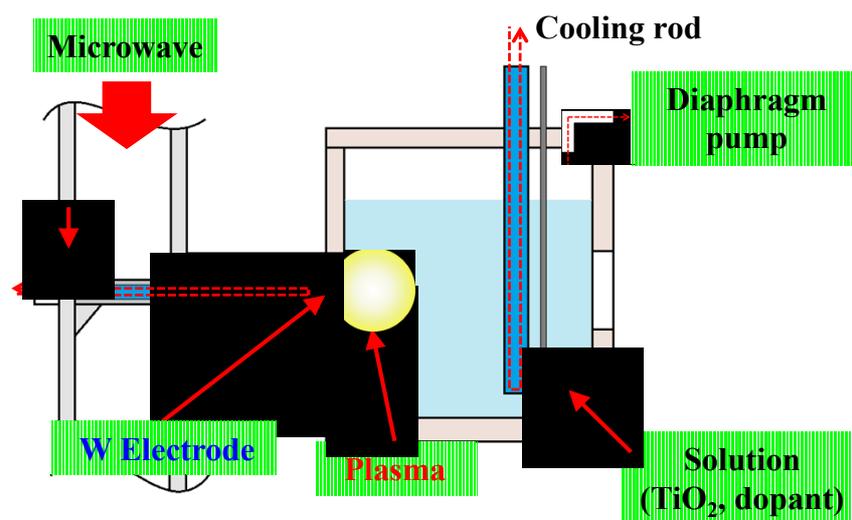


Figure S1. Experimental setup of microwave-induced plasma.



Figure S2. Photographs of decahedral TiO₂ nanoparticles. From left: bare decahedral TiO₂, after 40 min plasma treatment, and after alkaline treatment.

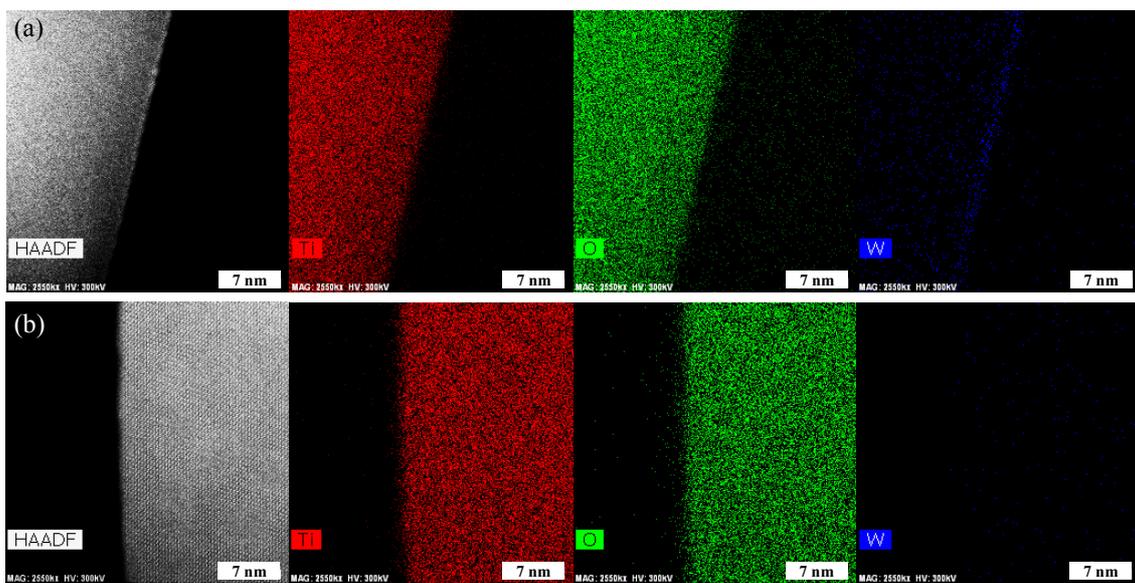


Figure S3. HAADF-STEM image and EDX mapping of plasma-treated decahedral TiO_2 nanoparticles before (a) and after (b) the alkaline treatment.

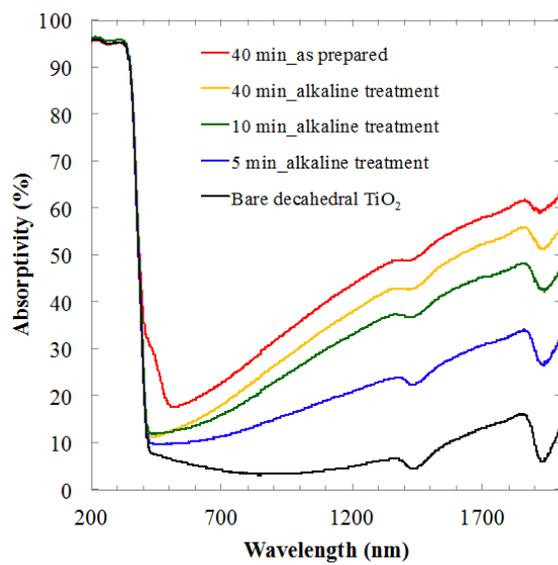


Figure S4. Diffuse reflectance spectra of plasma-treated TiO₂ nanoparticles for 200-2000 nm.

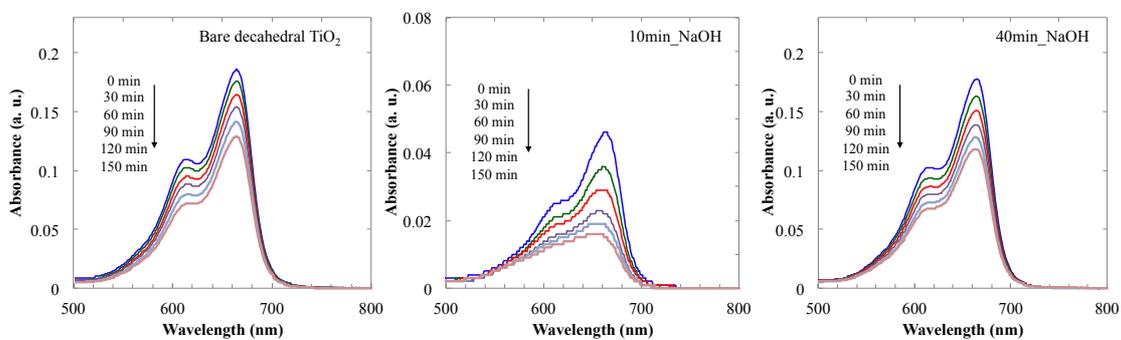


Figure S5. Absorption spectra of MB excited above 440 nm with time.