Supporting Information

Tantalum Cobalt Nitride Photocatalysts for Water Oxidation under Visible Light

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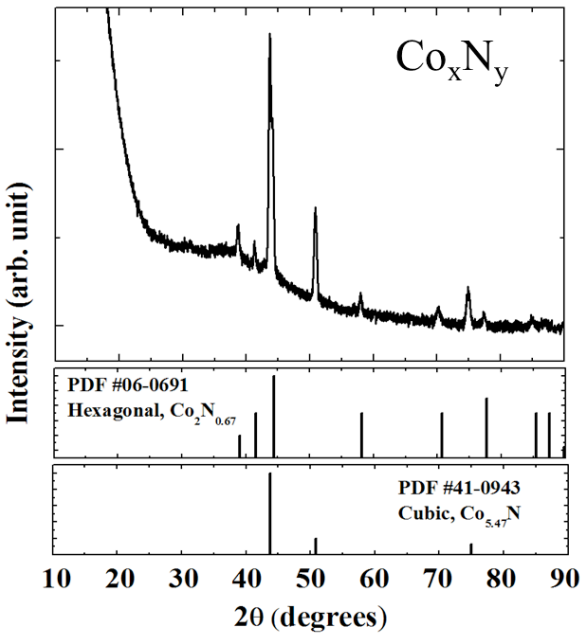

Figure S1. GIXRD patterns of Co_xN_y films prepared on Co foil.

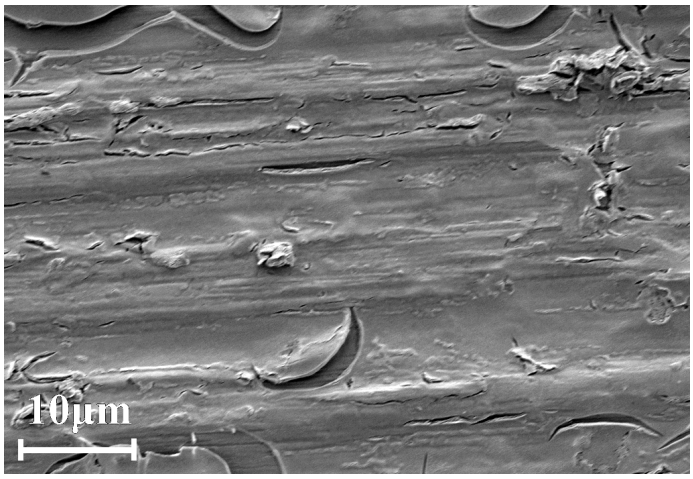

Figure S2. SEM image of $Ta_{0.8}Co_{0.2}N_x$ film on a Ta substrate. The samples were nitrided at 850°C for 2 h in an NH_3 gas flow of 100 mL/min.

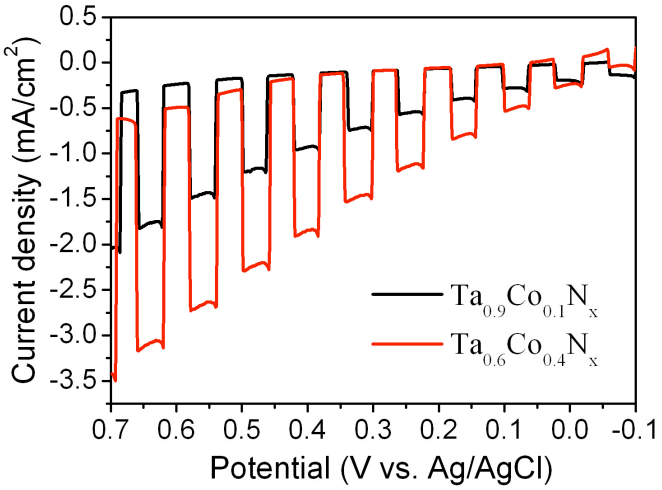

Figure S3. Linear sweep voltammograms of $Ta_{0.9}Co_{0.1}N_x$ and $Ta_{0.6}Co_{0.4}N_x$ films in 0.1 M hydroquinone aqueous solution under chopped UV-visible light irradiation. Scan rate: 20 mV/s. Light intensity: 110 mW/cm^2 (150W Xe lamp).

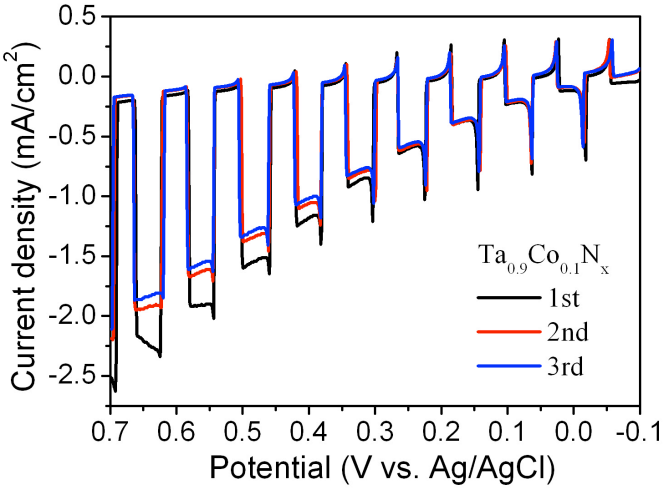

Figure S4. Linear sweep voltammograms of $Ta_{0.9}Co_{0.1}N_x$ films in 0.1 M Na_2SO_4 aqueous solution (pH 11) under chopped UV-visible light irradiation. Scan rate: 20 mV/s. Light intensity: 110 mW/cm^2 (150W Xe lamp).

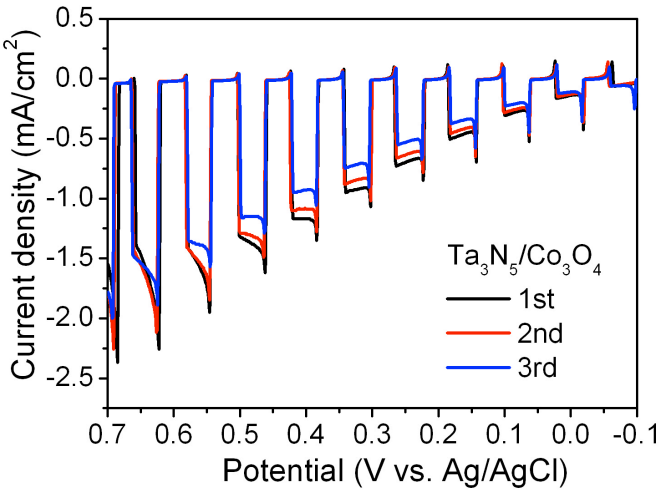

Figure S5. Linear sweep voltammograms of Ta_3N_5 films loaded with Co_3O_4 nanoparticles in 0.1 M Na_2SO_4 aqueous solution (pH 11) under chopped UV-visible light irradiation. Scan rate: 20 mV/s. Light intensity: 110 mW/cm^2 (150W Xe lamp).

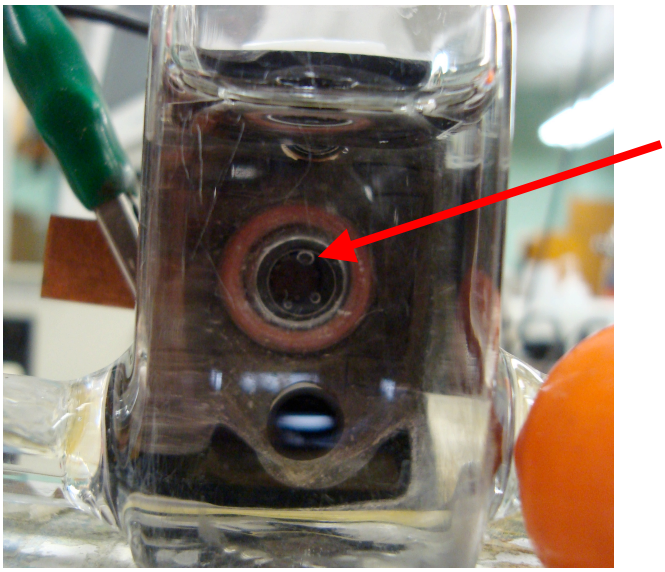

Figure S6. Oxygen bubbles on the surface of $Ta_{0.8}Co_{0.2}N_x$ electrode in 0.1 M Na_2SO_4 aqueous solution (pH 11) under UV-visible light irradiation. Light intensity: 110 mW/cm^2 (150W Xe lamp). The potential was kept at 0.0 V vs. Ag/AgCl.

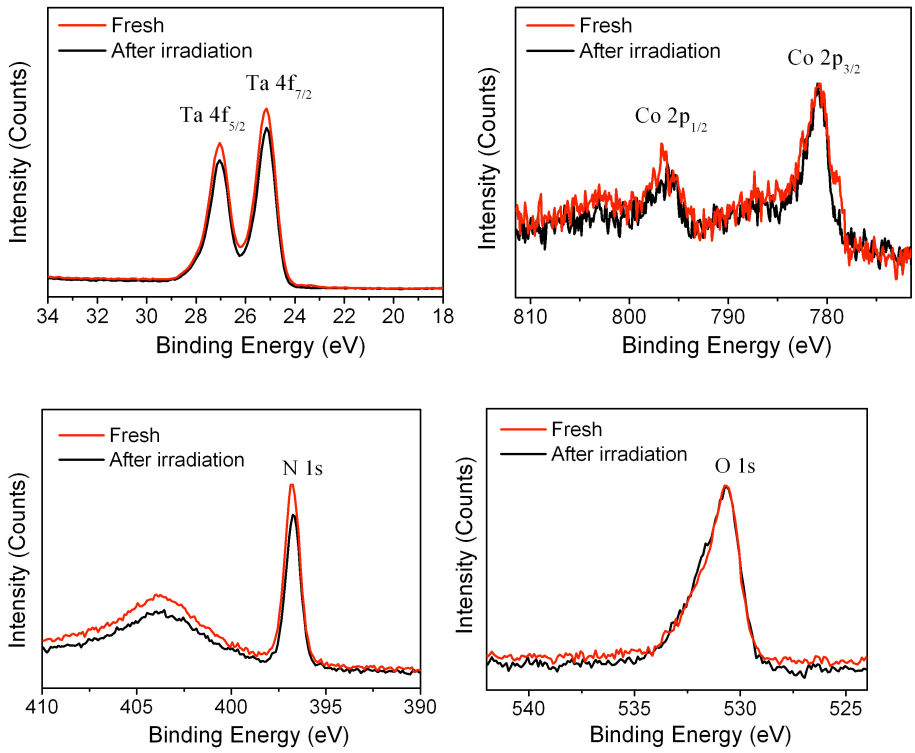

Figure S7. XPS spectra of $Ta_{0.6}Co_{0.4}N_x$ electrode before and after UV-visible light irradiation for 30 min in 0.1 M Na_2SO_4 aqueous solution (pH 11). Light intensity: 110 mW/cm^2 (150W Xe lamp). The potential was kept at 0.0 V vs. Ag/AgCl.

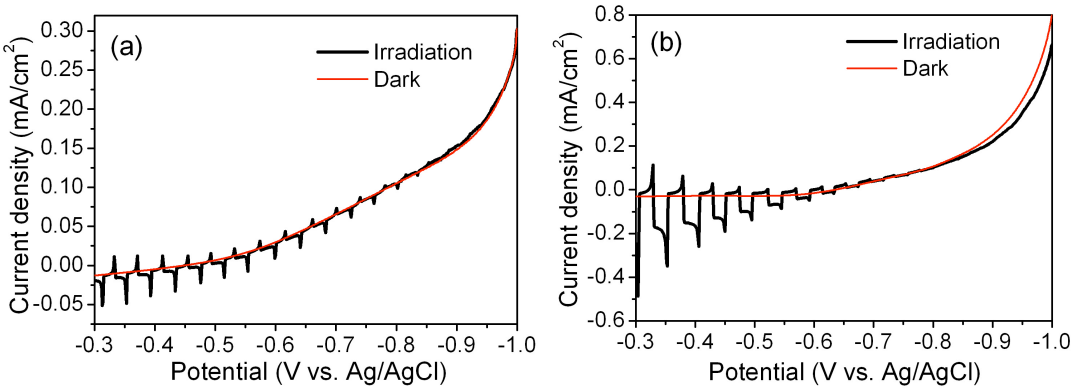

Figure S8. Linear sweep voltammograms of Ta_3N_5 (a) and $Ta_{0.8}Co_{0.2}N_x$ (b) films in 0.1 M Na_2SO_4 aqueous solution (pH 11) under chopped UV-visible light irradiation and dark. Scan rate: 20 mV/s. Light intensity: 110 mW/cm^2 (150W Xe lamp).