Supporting information

Enhanced Photocatalytic Performance of WON@Porous TiO_2 Nanofibers towards Sunlight-Assisted Degradation of Organic Contaminants

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Fig. S1 presents the Raman spectra of TiO_2 NFs, WON, and WON/TiO_2. Anatase has six characteristic Raman active modes, A_{1g}, $2B_{1g}$, and $3E_g$. Well resolved Raman peak can be observed at 143 cm^{-1} assigned to anatase vibrational mode $E_{1g}(1)$. Raman peak observed at 516 cm^{-1} attributed to A_{1g} and $B_{1g}(2)$. Other peaks at 196, 397, and 640 cm^{-1} designated to $E_g(2)$, $B_{1g}(1)$, and $E_g(3)$, respectively. Raman spectrum of WON revealed peaks at 128, 185, 260, 321, 700, and two combined peaks at 800 and 809 cm^{-1}. Peaks at 128 and 185 are assigned to lattice vibrations, those at 260 and 321 cm^{-1} to bending vibrations of O-W-O in the oxynitride, whereas the peaks at 795-805 cm^{-1} arise from stretching vibrations of O-W-O. All peaks corresponds different modes of vibrations in the corresponding oxide but broadened and shifted to lower wavenumbers as a result of oxygen loss from WO_3 structure with formation of new W-N bonds therefore increases the bond length in the oxynitride compared to the oxide counterpart. Upon coupling of TiO_2 NFs with WON, the Raman modes of TiO_2 dominates with slight shift of peaks to higher wavenumber which confirms the interaction between TiO_2 and WON (Fig. S2). [59]

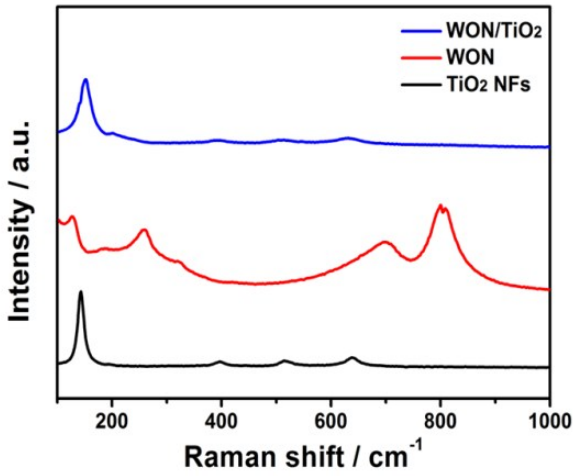

Fig. S1. Raman spectra of TiO_2 NFs, WON, and WON/TiO_2.

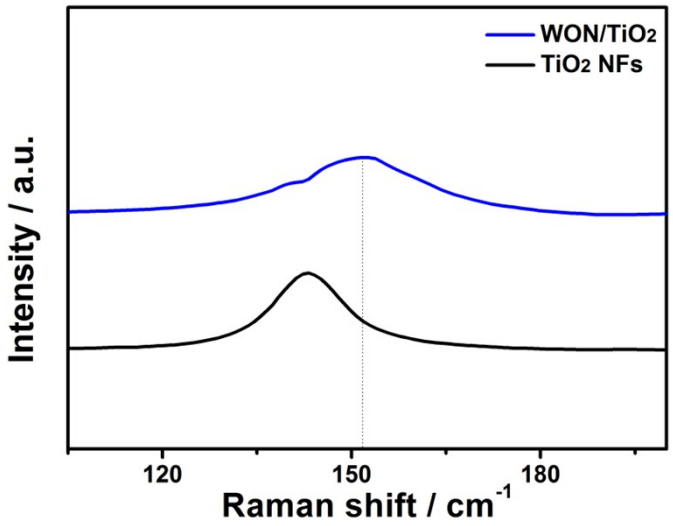

Fig. S2. Raman spectra of TiO_2 NFs compared to WON/TiO_2

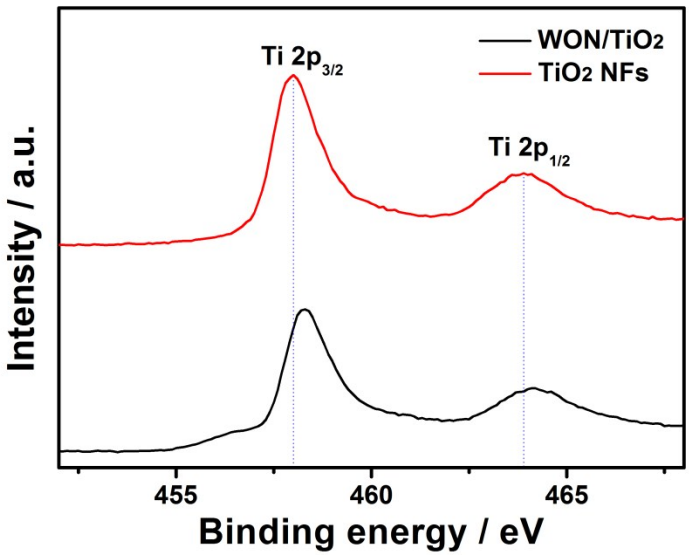

Fig. S3. (a) High resolution XPS spectra of Ti 2p in TiO_2 NFs and WON/TiO_2.

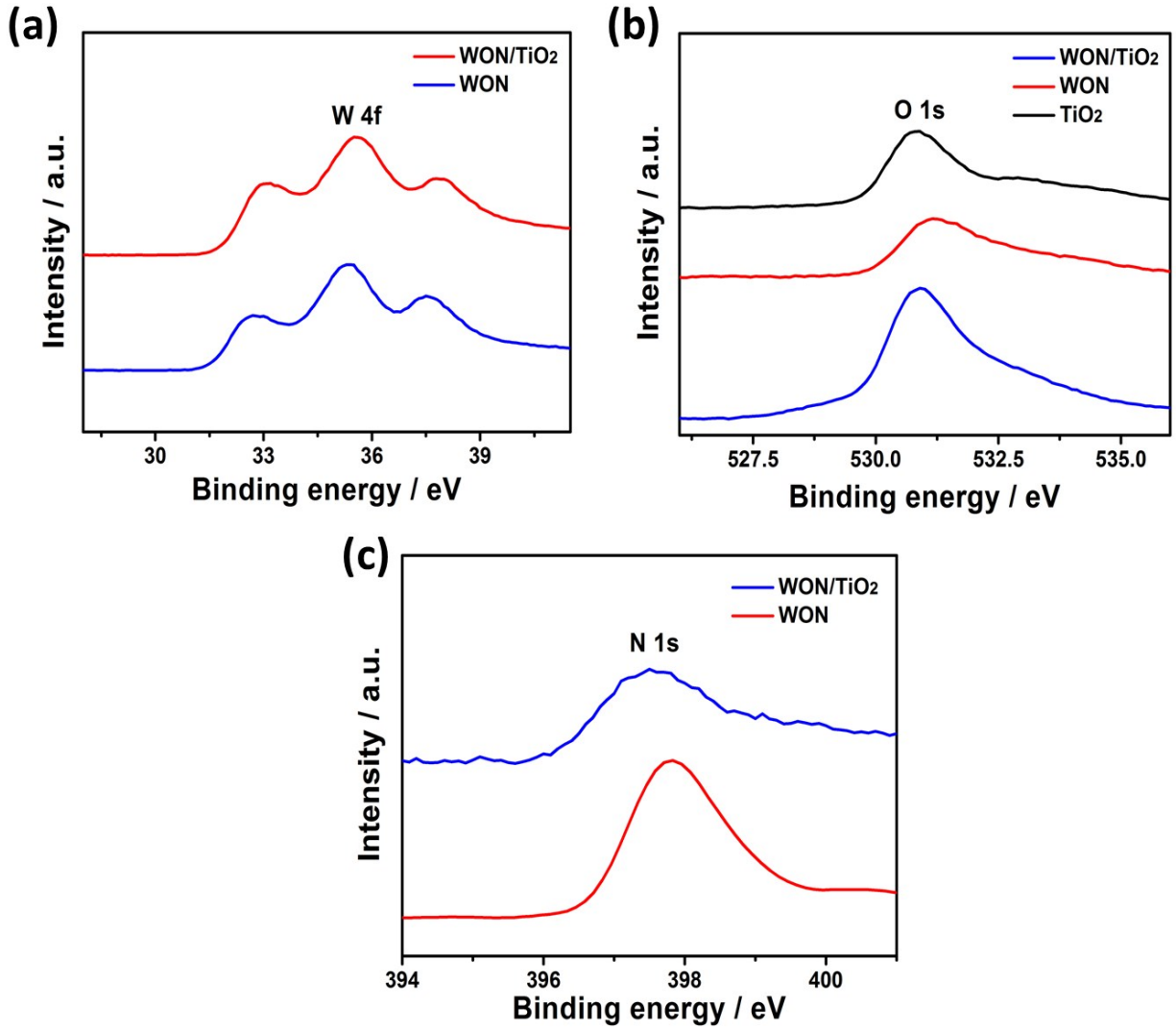

Fig. S4. (a) High resolution XPS spectra of W 4f, O 1s, and N 1s of different photocatalysts.