Supplementary Information

Green synthetic approach for self-doped TiO_2 with exposed high-reactive facets with efficient CO_2 photoreduction under visible light

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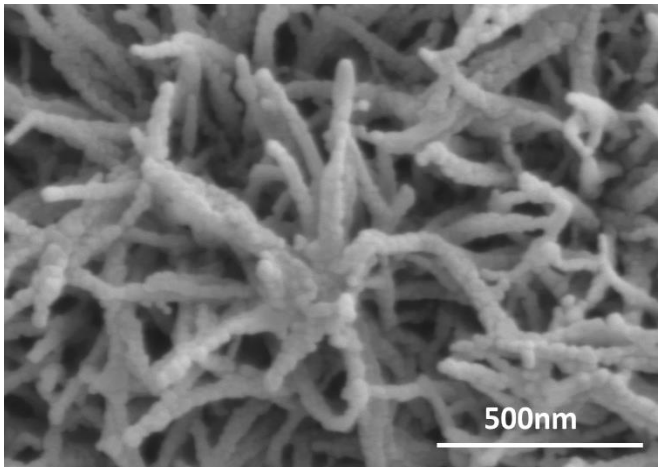

Figure S1. SEM images of Ti-foil after water bath and calcination.

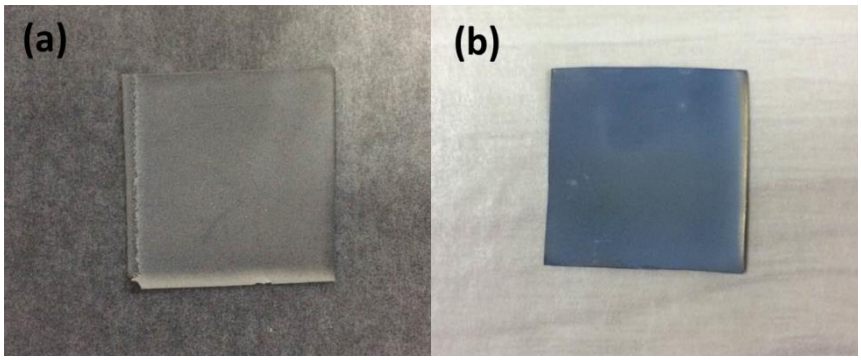

Figure S2. Photographs of samples $1^{\#}$ (a) and $2^{\#}$ (b) The reason for the different colours is that DBD cold plasma introduces affluent intrinsic defects in the TiO_2 film in sample $2^{\#}$.

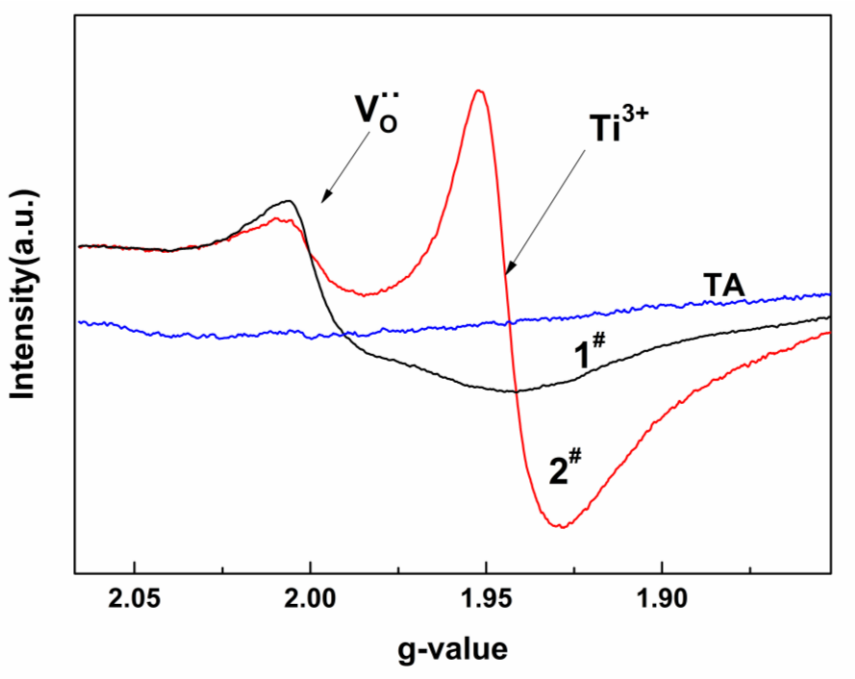

Figure S3. The EPR spectra of samples $1^{\#}$, $2^{\#}$ and TA

In order to identify the effect of the crystal facets on the TiO_2 self-doping, an experiment in the absence of the (001) and (111) facets was conducted. The synthesis procedure was similar to that for samples $1^{\#}$ and $2^{\#}$, but with different starting reagents. In the fabrication of the TiO_2 film, H_2O H_2SO_4 and tetrabutyltitanate (TBT) (volume ratio 30:6:1) were used as regents without HF and H_2O_2. This sample was named "TA". As shown in Figure S3 there are no signals for Ti^{3+} and $V_O^{\cdot\cdot}$, which illustrates that there are no exposed high-reactive facets. Additionally, in the next step of the experiment (DBD cold plasma), the TA cannot be reduced to blue. This experiment illustrates that the high-reactive facets have a great influence on the DBD cold plasma reduction, which is the approach herein to self-doping.

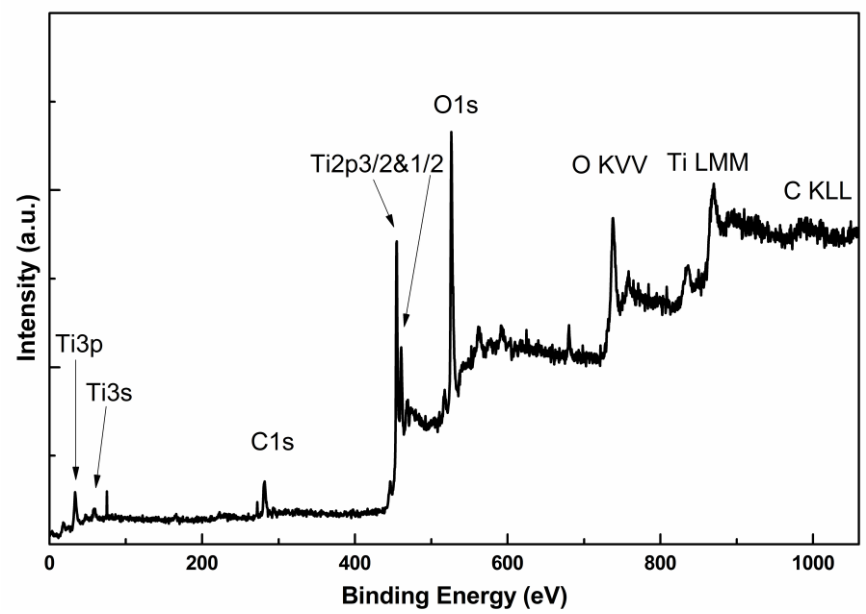

Figure S4. The full XPS spectra of anatase film