

**Supporting Information for**  
**Enhanced photocatalytic conversion and selectivity of nitrate**  
**reduction to nitrogen over AgCl/TiO<sub>2</sub> nanotubes**

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Table of Contents

The measurement method.....	S-2
The mercury lamp output spectrum.....	S-3
TEM images .....	S-4

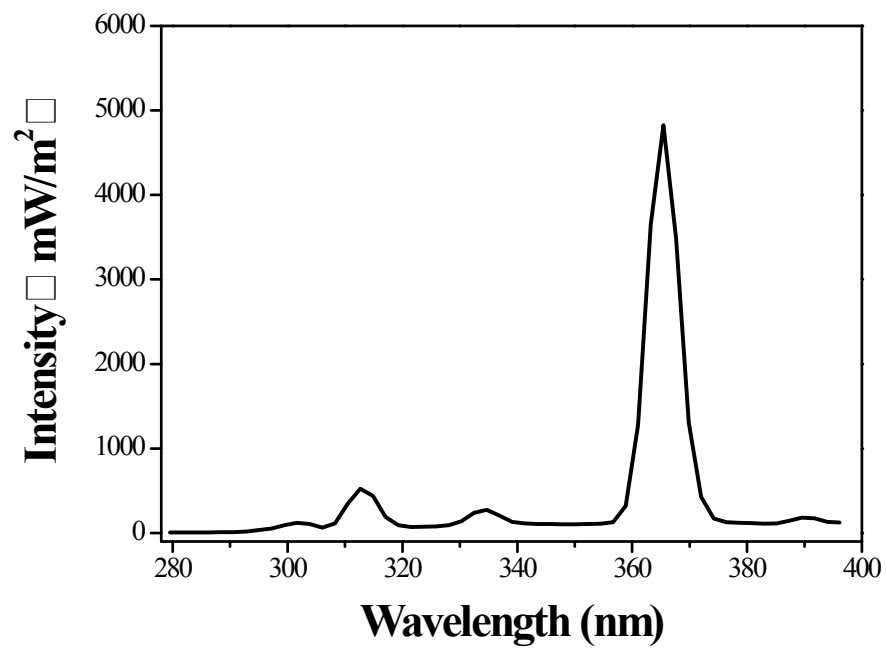
### **The measurement method of nitrate, nitrite and ammonium.**

Nitrate: The measurement method is called thymol spectrophotometry(GB/T5750.5-2006), which is able to detect  $0.5 \text{ mg}\cdot\text{L}^{-1} \text{ NO}_3\text{-N}$  at a minimum. The main process is as follow: Add 0.1 mL ammonium sulfamate (20 g ammonium sulfamate in 1 L  $3.5 \text{ mol}\cdot\text{L}^{-1}$  acetic acid) to standard solution and samples respectively, and then mix well. After 5 minutes, add 0.2 mL thymol ethyl alcohol solution (0.5 g thymol in 100 mL ethyl alcohol) and 2.0 mL sulfuric acid and silver sulfate solution (1 g silver sulfate in 100 mL sulfuric acid). After 5 minutes, add 8 mL distilled water in above solution and then dropwise add ammonium hydroxide (32%) until the sediment disappears. After cooling to room temperature, record the absorbance in the spectrophotometer at 415 nm against the blank, and then plot concentration against absorbance. The  $\text{NO}_3\text{-N}$  concentrations of samples are calculated by standard curve.

Nitrite: The measurement method is called N-(1-naphthyl)-1,2-diaminoethane dihydrochloride spectrophotometry(GB7493-87), which is applicable in the range from  $0.003 \text{ mg}\cdot\text{L}^{-1}$  to  $0.20 \text{ mg}\cdot\text{L}^{-1} \text{ NO}_2\text{-N}$ . The main process is as follow: Add 1.0 mL color developing agent which composed of 20.0 g Aminobenzenesulfonamide, 1.0 g N-(1-naphthyl)-1,2-diaminoethane dihydrochloride, 50 mL phosphoric acid and 500 mL distilled water to each standard solution and samples, and then mix and keep pink to last at least 20 minutes. Then record the absorbance in the spectrophotometer at 540 nm against the blank, and then plot concentration against absorbance. The  $\text{NO}_2\text{-N}$  concentrations of samples are calculated by standard curve.

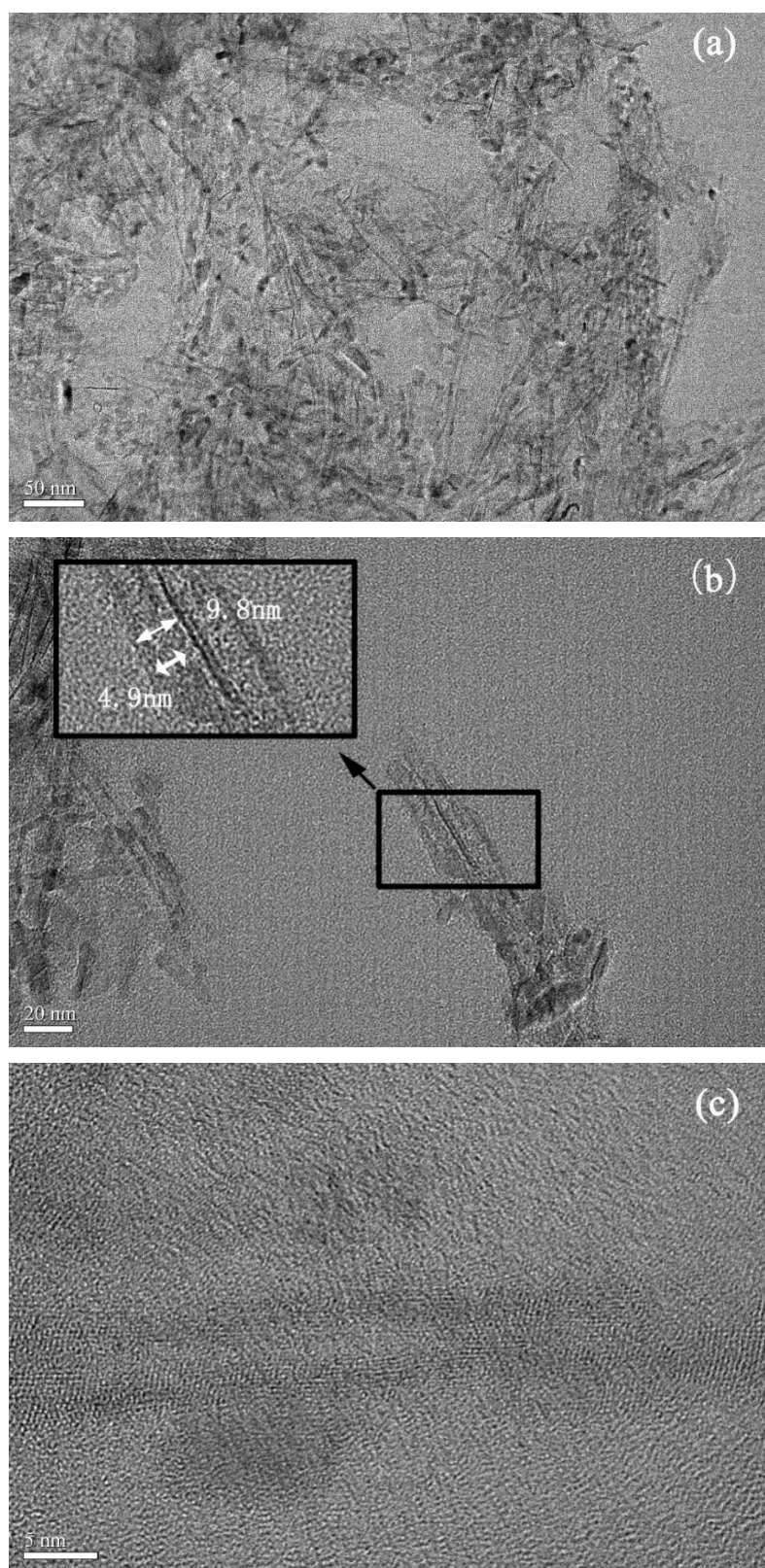
Ammonia: The measurement method is called indophenol blue spectrophotometry(GB/T18204.2-2014), which is applicable in the range from  $0.005 \text{ mg}\cdot\text{L}^{-1}$  to  $1.0 \text{ mg}\cdot\text{L}^{-1} \text{ NH}_3\text{-N}$ . The main process is as follow: Add 0.5 mL  $50.0 \text{ g}\cdot\text{L}^{-1}$  salicylic acid solution, 0.1 mL  $10 \text{ g}\cdot\text{L}^{-1}$  sodium nitroprusside and 0.1 mL  $0.05 \text{ mol}\cdot\text{L}^{-1}$  sodium hypochlorite to each standard solution and samples. After mix well and keep blue to last 60 minutes, record the absorbance in the spectrophotometer at 697 nm against the blank, and then plot concentration against absorbance. The  $\text{NH}_3\text{-N}$  concentrations of samples are calculated by standard curve.

### The mercury lamp output spectrum



SI Fig. 1 The mercury lamp output spectrum used in our experiment

## TEM images



SI Fig. 2 The TEM (a, b) and HRTEM (c) of TNTs