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Supporting Information

Toward highly efficient photocatalysis: flow-through Pt@TiO_2@AAO membrane nanoreactor prepared by atomic layer deposition

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Atomic layer deposition instruments for fabrication of TiO_2 film and Pt nanoparticles

1. TiO_2 Film (horizontal flow-type ALD, designed and constructed by Instrument Technology Research Center (ITRC), Taiwan and National Tsing Hua University (NTHU), Taiwan)

$TiCl_4$ and H_2O were used as precursors. The purge times of $TiCl_4$ and H_2O were 0.4 s and 0.2 s, respectively. All precursor pulses were separated by 5 s of N_2 purge. Precursors were kept equilibrium at room temperature (~25 ^oC). No carrier gas was applied. The substrate temperature was 100 ^oC and working pressure was 2 mTorr. The growth rate was approximately 0.58 Å per cycle.

2. Pt Nanoparticles (vertical flow-type ALD, designed by Instrument Technology Research Center (ITRC), Taiwan and National Tsing Hua University (NTHU), Taiwan and constructed by SYSKEY Technology, Taiwan)

$MeCpPtMe_3$ and oxygen were used as precursors. $MeCpPtMe_3$ pulse (1 s) and O_2 pulse (5 s) were separated by 20 s of N_2 purge. Precursors were kept equilibrium at 80 ^oC. No carrier gas was applied. The Pt deposition was carried out for 50 cycles. Substrate temperature was kept at 350 ^oC.

Fig. 1 Photographs of the home-made ALD systems.