

Electronic Supplementary Information (ESI)

Investigation of Localized Surface Plasmon/Grating-coupled Surface Plasmon Enhanced Photocurrent in TiO₂ Thin Films

Supeera Nootchanat,^{ab} Hathaitip Ninsonti,^{bc} Akira Baba,^{*a} Sanong Ekgasit,^{*b} Chuchaat Thammacharoen,^b Kazunari Shinbo,^a Keizo Kato^a and Futao Kaneko^a

^a Center for Transdisciplinary Research and Graduate School of Science and Technology,

Niigata University 8050 Ikarashi 2-nocho, Nishi-ku, Niigata, 959-2181 Japan

^b Sensor Research Unit, Department of Chemistry, Faculty of Science, Chulalongkorn University,
Bangkok 10330, Thailand

^c Department of Chemistry, Faculty of Science, Chiang Mai University, Chiang Mai 50200, Thailand

*E-mail: ababa@eng.niigata-u.ac.jp, sanong.e@chula.ac.th

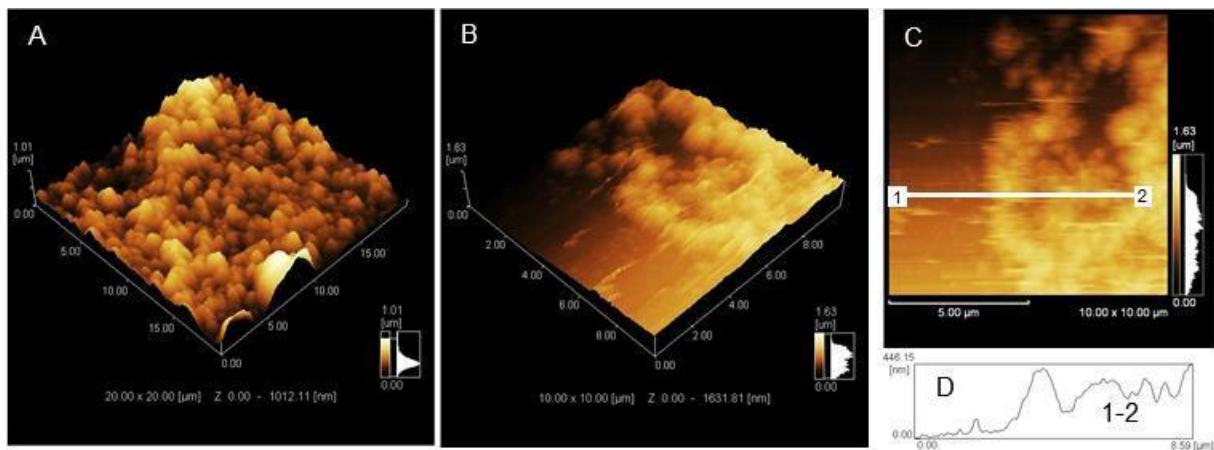


Figure S1. (A) The AFM micrograph of the AuNP–TiO₂ nanocomposites coated on an ITO-glass substrate. (B) and (C) are the AFM micrograph at the scratch edge on the film of the AuNP–TiO₂ nanocomposites. (D) The cross section profile corresponded to the line 1-2 in in (C)

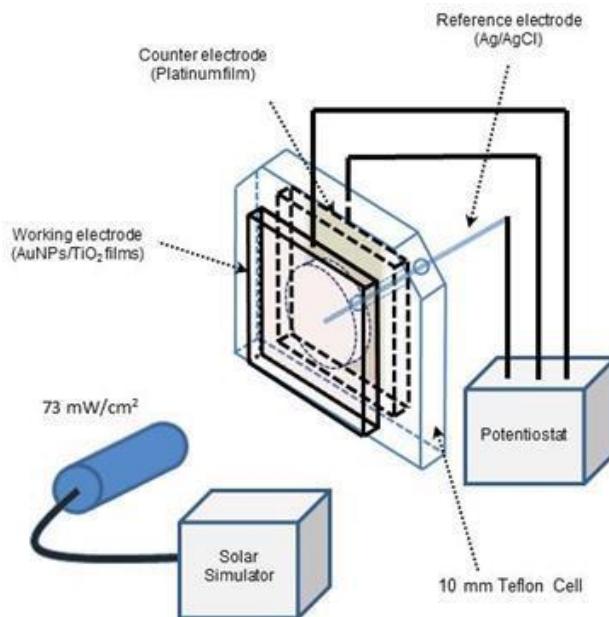


Figure S2. The photocurrent measurement apparatus for the AuNP–TiO₂ nanocomposites coated on ITO-glass substrates.

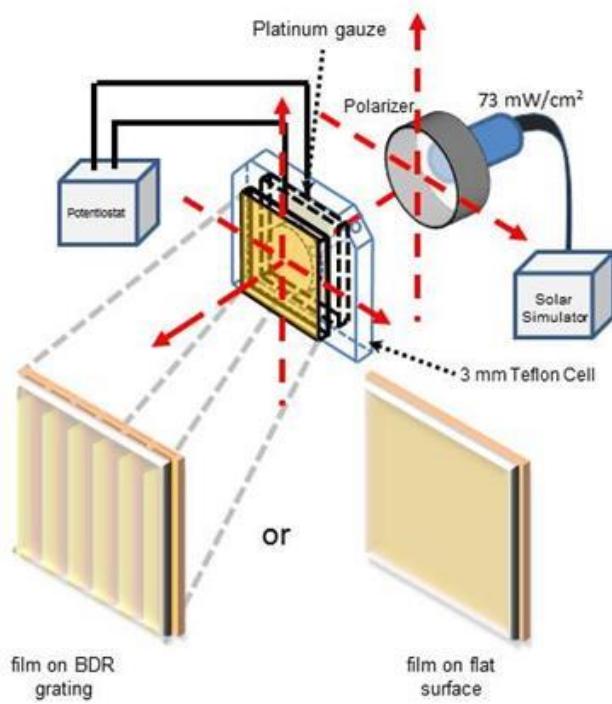


Figure S3. The photocurrent measurement apparatus for the AuNP–TiO₂ nanocomposites coated on gold grating pattern.

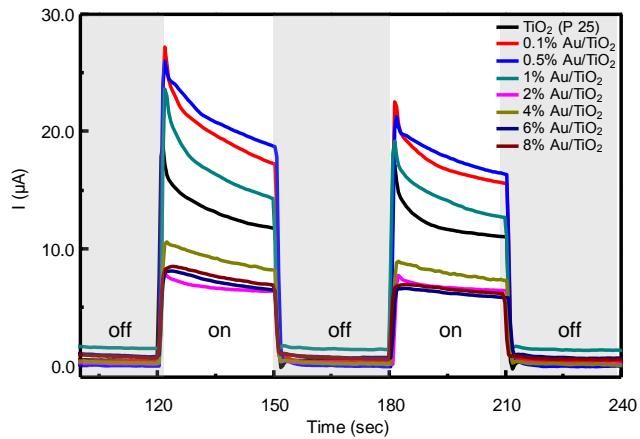


Figure S4. Short-circuit photocurrent TiO_2 and $\text{AuNP}-\text{TiO}_2$ nanocomposites with various amount of percentage Au/TiO_2 with and without white light illumination.

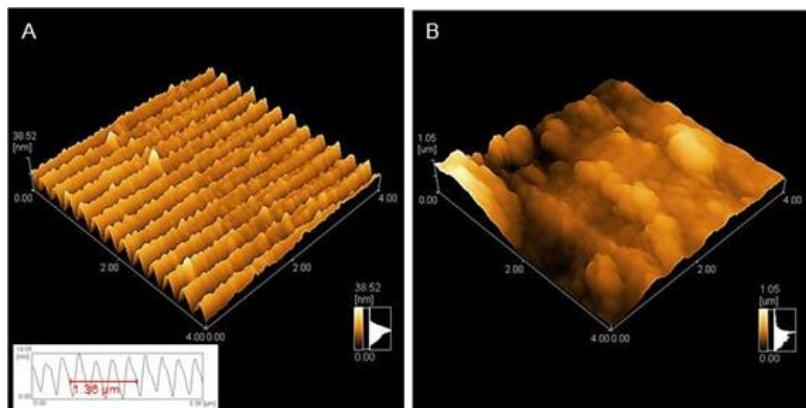


Figure S5. (A) The AFM micrograph of a bare gold grating substrate. The inset in (A) indicates the grating pitch of 330 nm. (B) The AFM micrograph of fabricated TiO_2/gold grating.

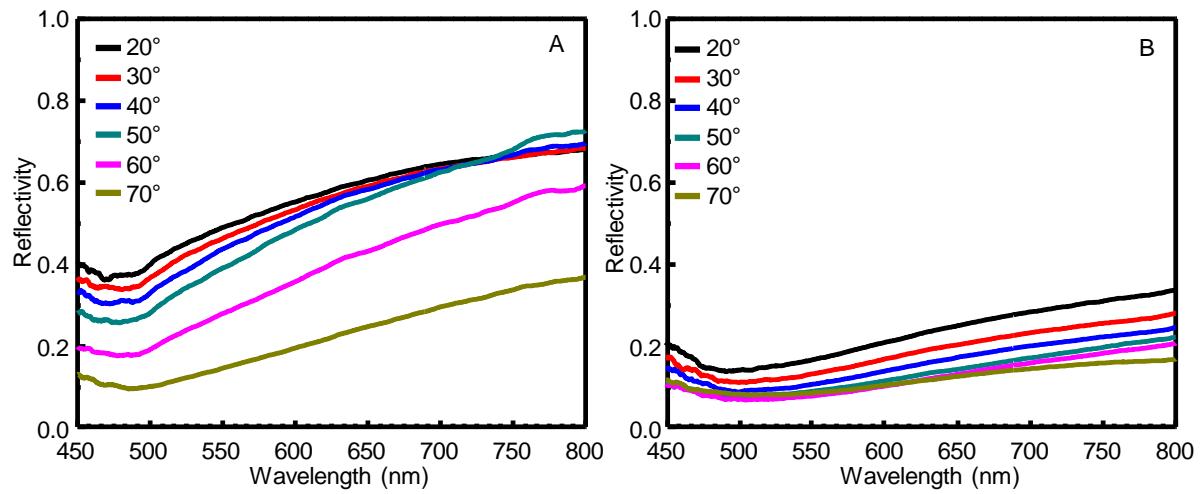


Figure S6. The SPR reflectivity curves of (A) TiO_2 /gold grating photocatalyst electrode and (B) AuNPs- TiO_2 nanocomposites/gold grating photocatalyst electrode irradiated with s-polarization.

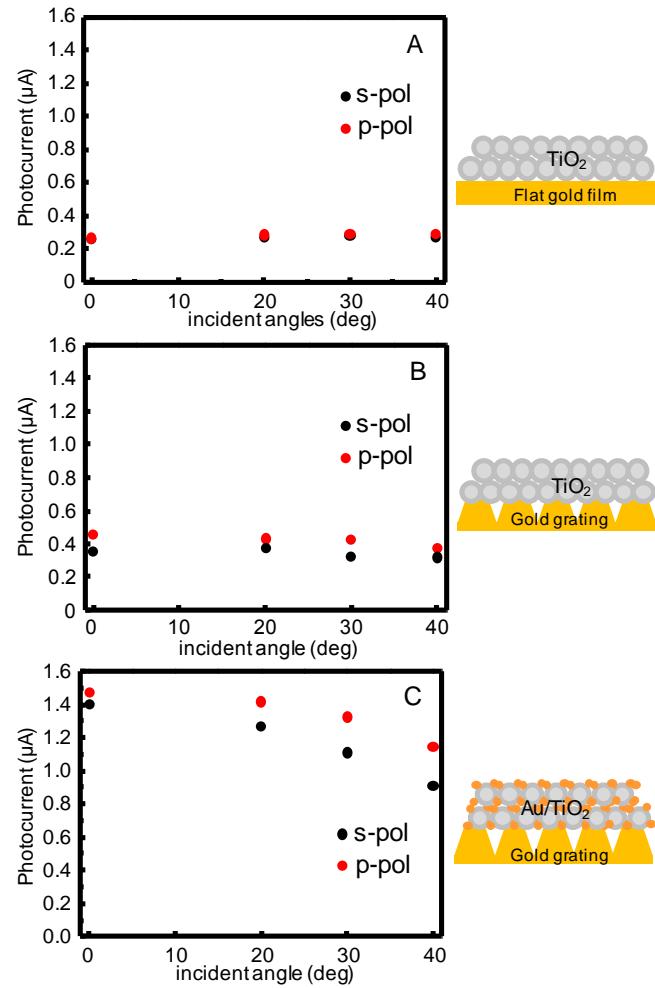


Figure S7. The short-circuit photocurrent of (A) TiO₂/flat gold, (B) TiO₂/gold grating, and (C) AuNP–TiO₂ nanocomposites/gold grating compared between s- and p-polarization .