Supporting Information for:

ZnGaNO Photocatalyst Particles Prepared from Methane-based Nitridation Using Zn/Ga/CO_3 LDH as Precursor

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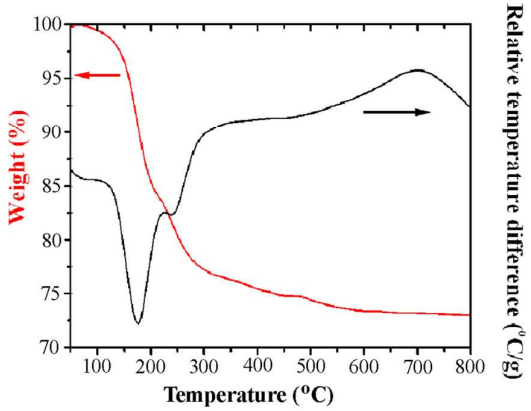

Fig. S1. DTA and TGA curves for the Zn/Ga/CO_3 LDH precursor powder

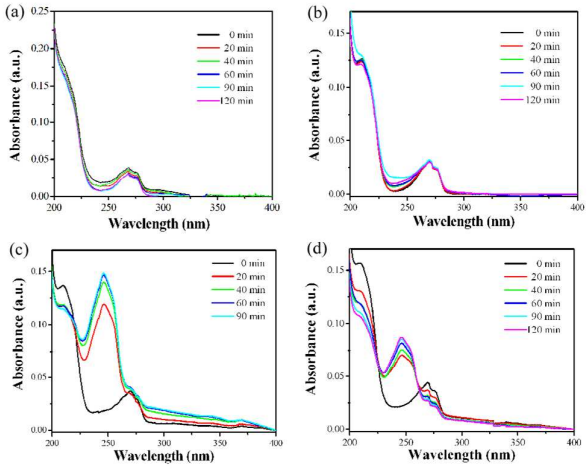

Fig. S2. UV-Vis absorption spectra of phenol solutions upon visible-light irradiation in the presence of (a) S50, (b) S50 loaded with Rh, (c) S50 loaded with 5 wt.% RuO_2, and (d) S50 loaded with both Rh and 5 wt.% RuO_2. The absorbance peaks at 210 nm and 271 nm corresponds to phenol, 244 nm to the intermediate BQ, and 276 nm to intermediate catechol.

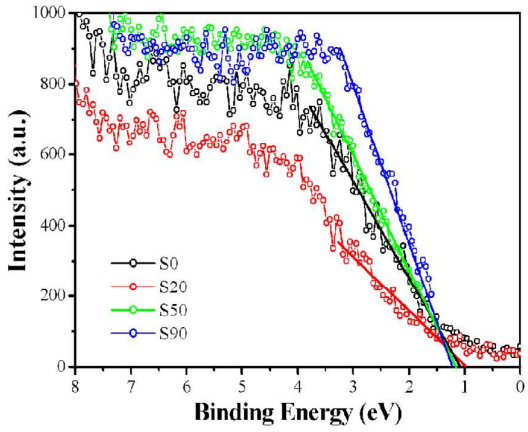

Fig. S3. States of the binding energy using XPS observed for S0, S20, S50, and S90. The spectrum end (point of intersection with the background) corresponds to a valence band maximum (E_V), indicating the value of E_V increasing in the order of S20 < S0 < S50 < S90.

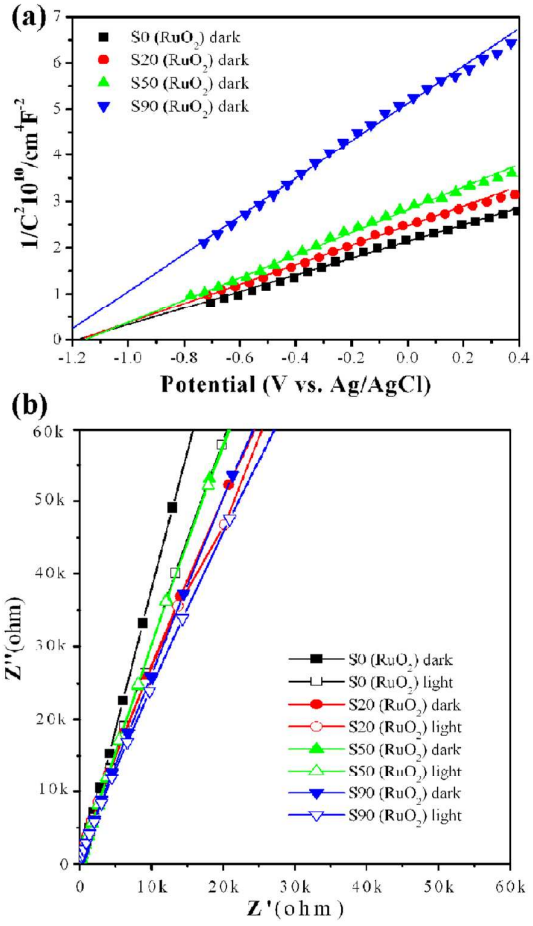

Fig. S4. (a) Mott−Schottky plots and (b) EIS Nyquist plots of FTO electrodes covered with 5 wt.% RuO_2-loaded S0, S20, S50, and S90.

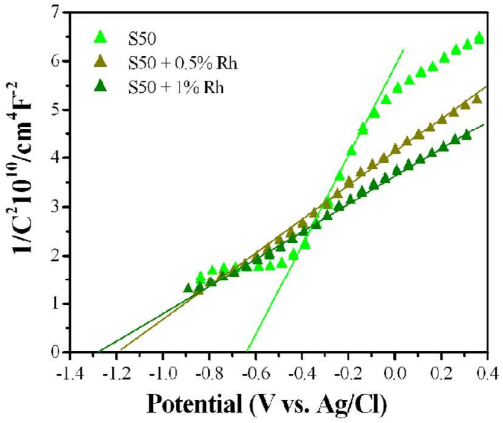

Fig. S5. (a) Mott−Schottky plots of FTO electrodes covered with S50 loaded with different amount of Rh. The particles were prepared by photo-deposition of Rh on S50 particles (0.4 g) which were dispersed in 200 ml aqueous solution containing 20 ml methanol and 0 mg, 15.7 mg, 23.39 mg of $Na_3[RhCl_6]\cdot xH_2O$ (Rh 17.1 wt.%), respectively. The obtained powder samples were named as S50, S50+0.5% Rh, and S50+1% Rh, respectively. 0.05 g of the loaded powder was then sonicated in a solution containing 8 ml water, 1.5 ml isopropanol, and 0.5 ml nafion solution (5 wt. %). The suspension was dropped onto a cleaned FTO surface, slowly dried, and repeated several times until a uniform area of 1.5 cm^2 was achieved.