Boosting photocatalytic H_2O_2 production by coupling of sulfuric acid and 5-sulfosalicylic acid incorporated polyaniline with g-C_3N_4

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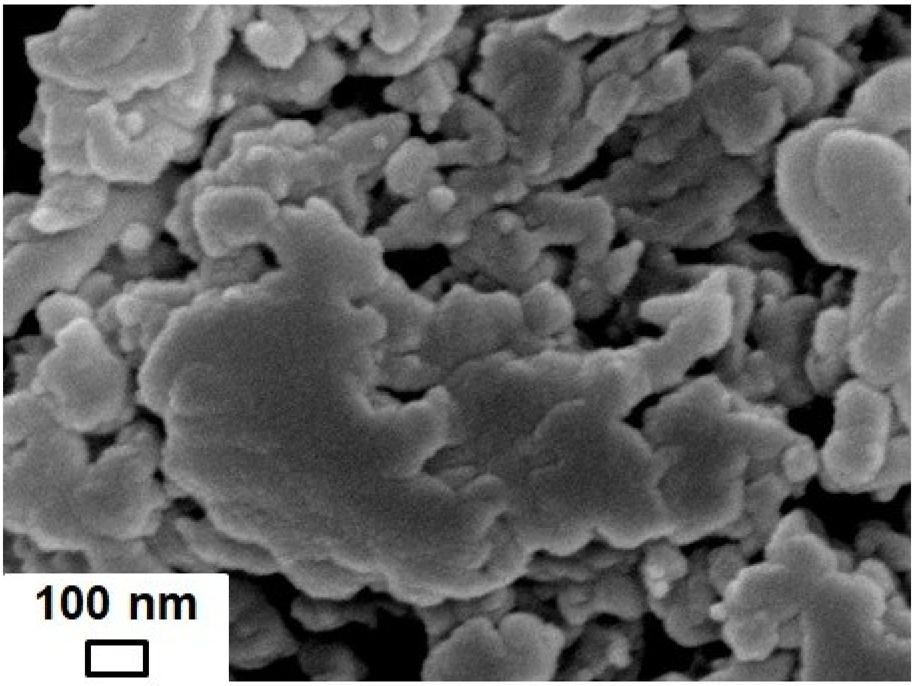

Figure S1 SEM image of undoped PANI.

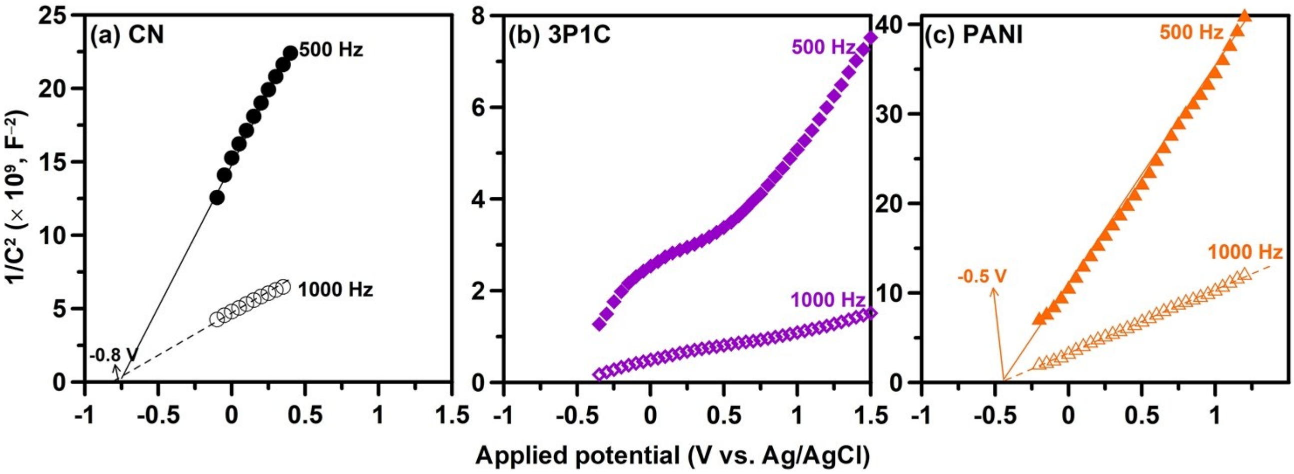

Figure S2 Mott-Schottky plot of (a) CN, (b) 3P1C, and (c) PANI samples measured at 500 and 1000 Hz in an aqueous Na_2SO_4 solution (0.5 M, pH = 6.6).

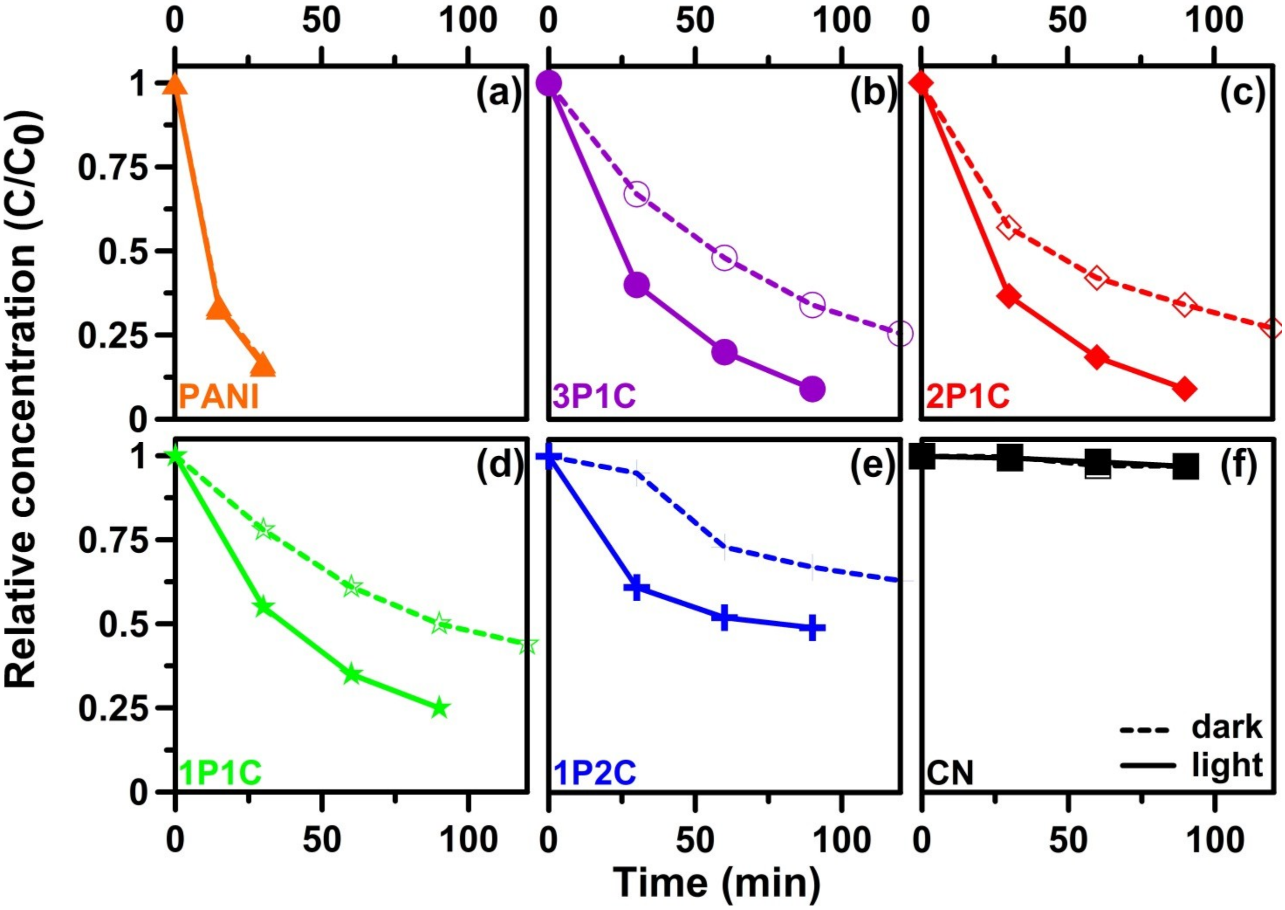

Figure S3 Photocatalytic decoloration of MB aqueous solution (40 ppm, 250 mL) using CN, PANI, and *m*P*n*C samples under visible-light irradiation or dark condition.

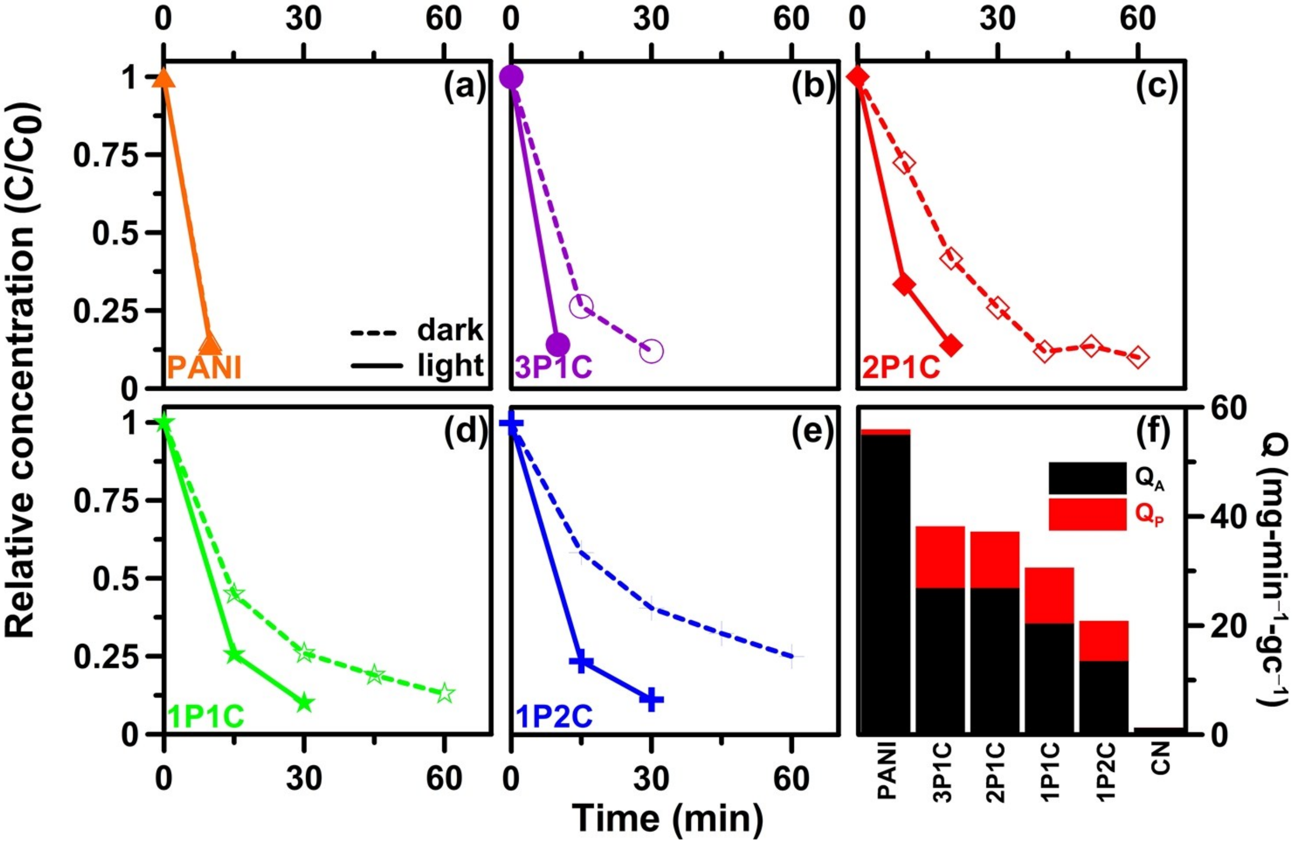

Figure S4 (a-e) Photocatalytic decoloration of MB aqueous solution (20 ppm, 250 mL) using CN, PANI, and *m*P*n*C samples under visible-light irradiation or dark condition. (f) Photocatalytic (Q_P) and adsorption capacities (Q_A) per unit time per unit catalyst for these samples.

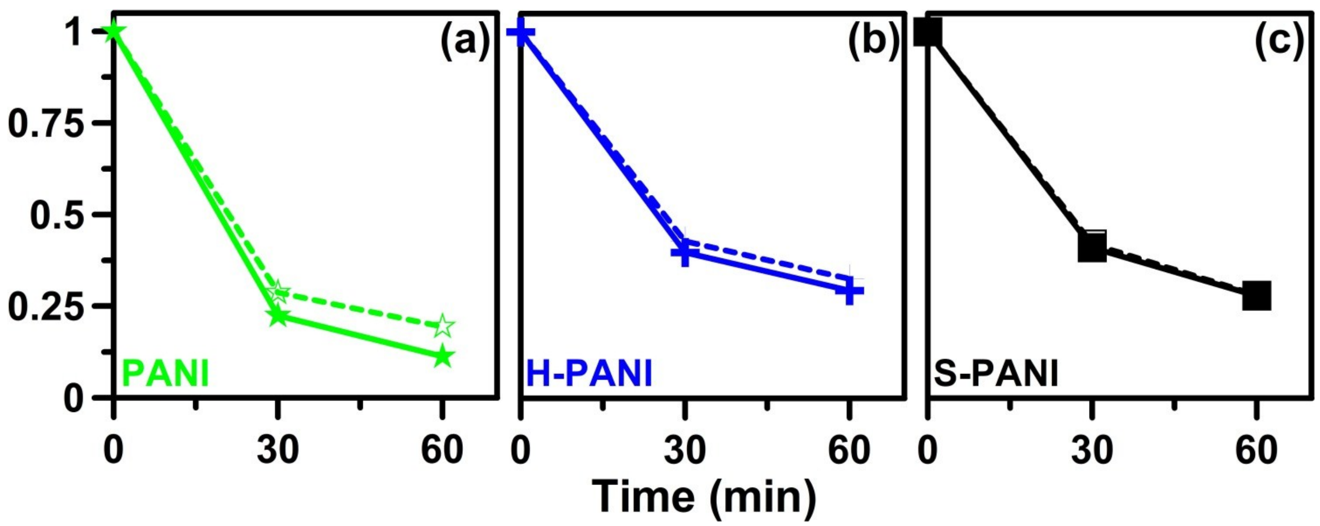

Figure S5 Photocatalytic decoloration of MB aqueous solution (80 ppm, 250 mL) using PANI, and H-PANI (H_2SO_4 mono-doped PANI), S-PANI (SSA mono-doped PANI) samples under visible-light irradiation or dark condition.

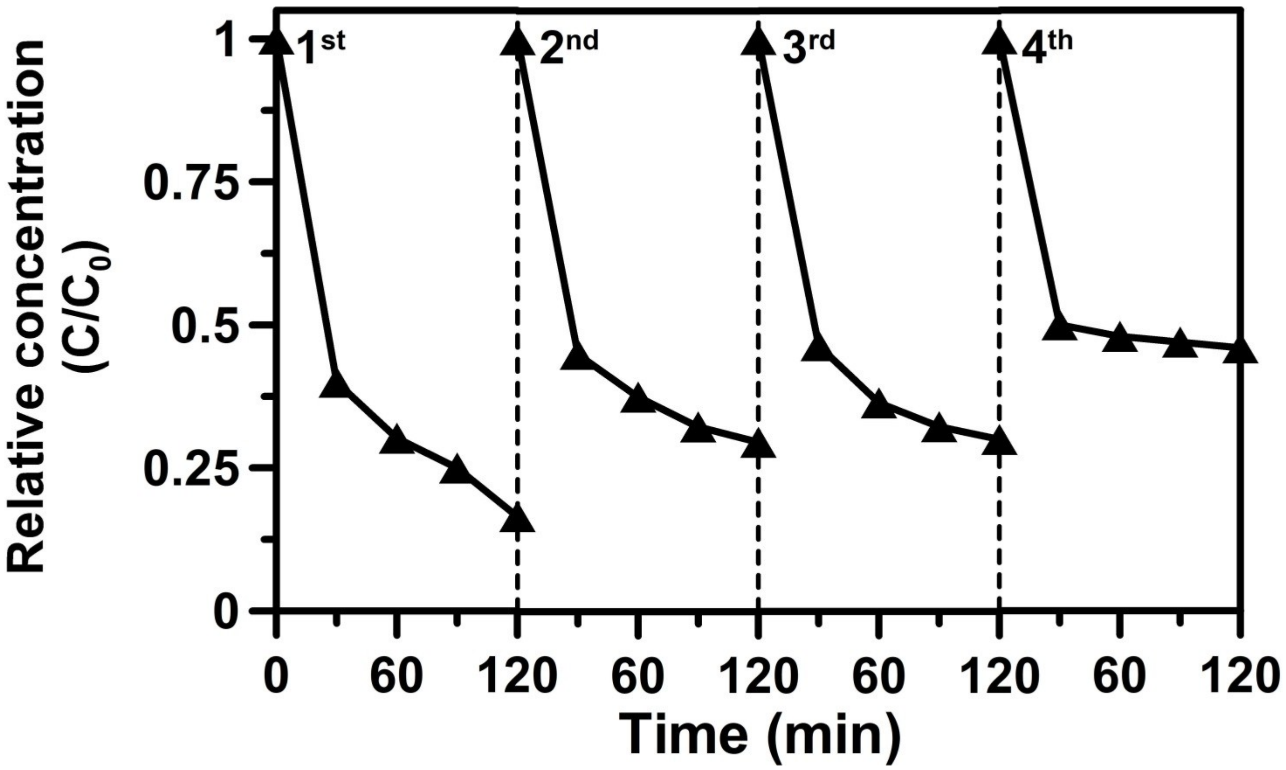

Figure S6 Cycle test for photocatalytic decoloration of MB aqueous solution (40 ppm, 250 mL) using 3P1C sample under visible-light irradiation.

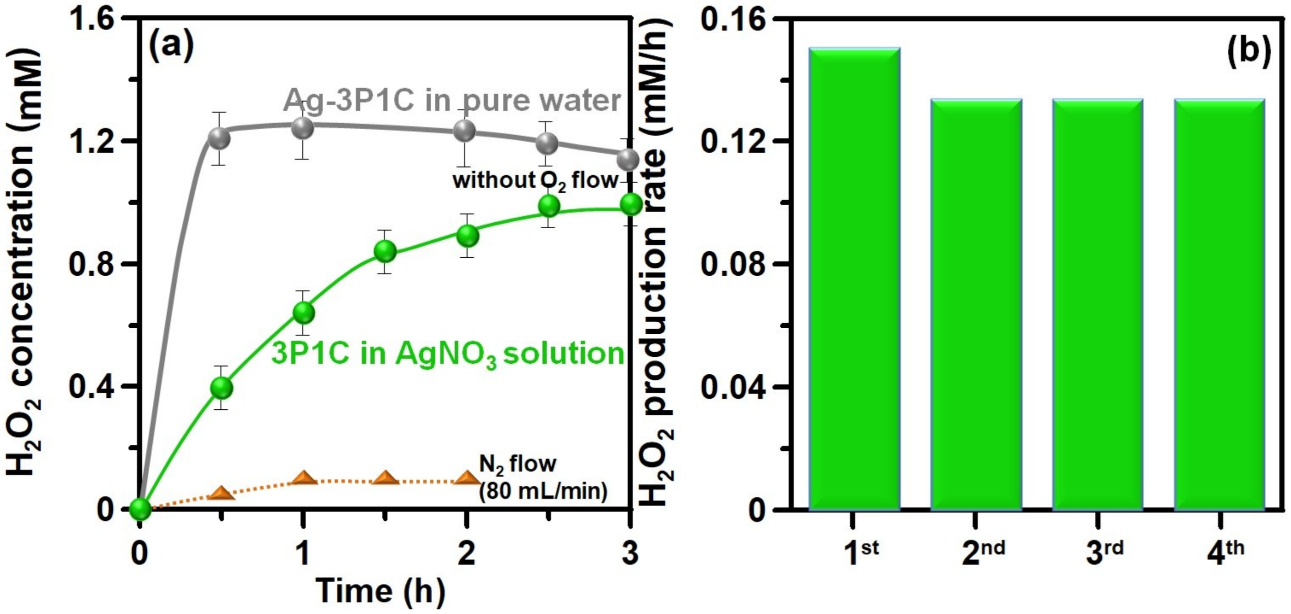

Figure S7 Time-dependent change in H_2O_2 concentration during photocatalytic reaction using 3P1C or Ag-deposited 3P1C sample in the solution containing $AgNO_3$ (400 ppm) as sacrificial reagent or pure water without O_2 flow, and 3P1C sample in the pure water with N_2 flow (80 mL/min); (b) H_2O_2 production rate in the repeated reaction in the presence of IPA (20 vol%) with O_2 flow rate of 80 mL-min^{-1} using 3P1C sample (0.25 g) under simulated solar irradiation for 3 h.

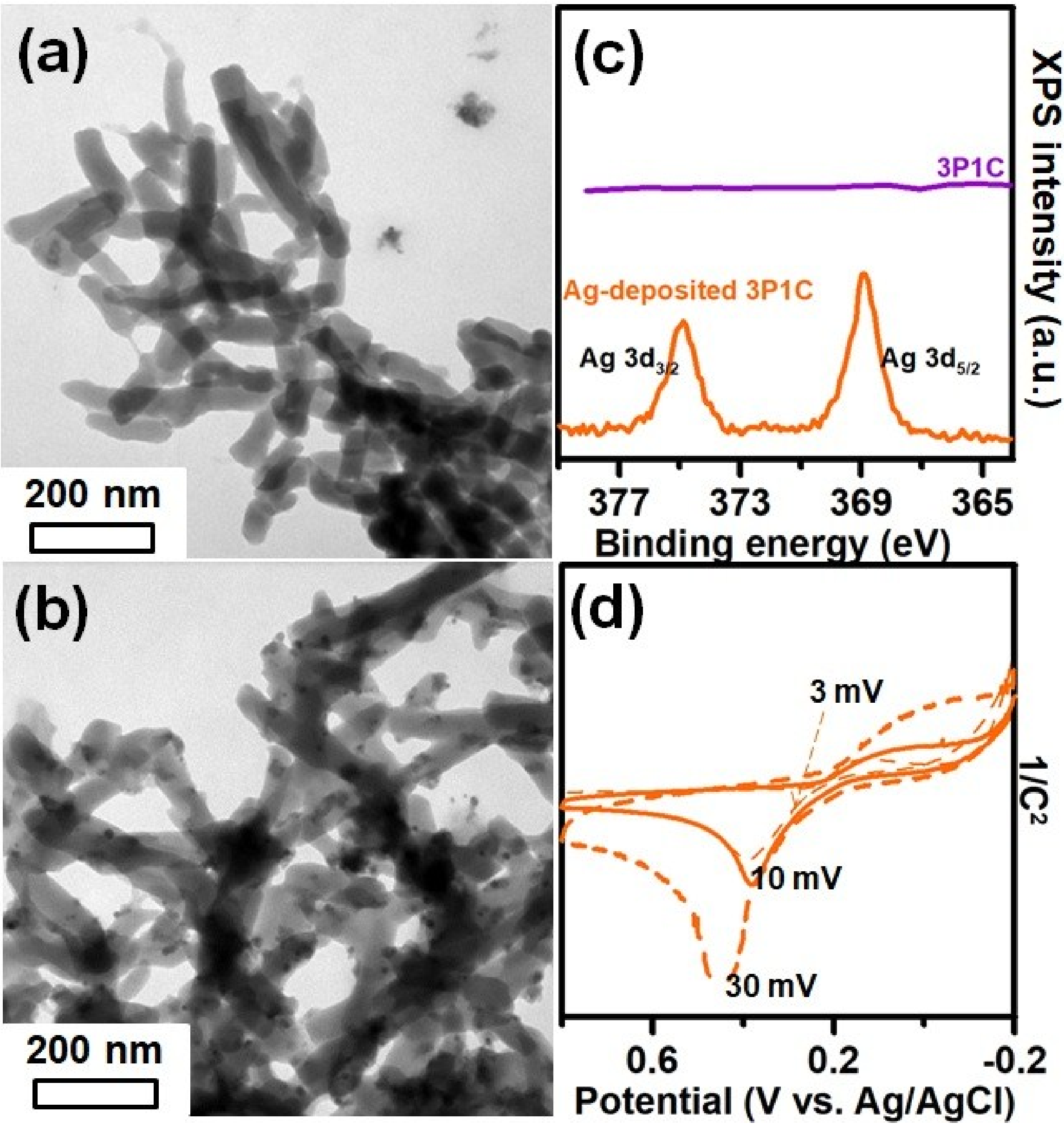

Figure S8 TEM images of (a) 3P1C and (b) Ag-deposited 3P1C samples. (c) High resolution XPS spectra of Ag 3d level, and cyclic voltammetry (CV) of the Ag-deposited 3P1C sample in 0.1 M of H_2SO_4 aqueous solution (pH = 0.8) at a scan rate of 3, 10, and 30 mV s^{-1}.

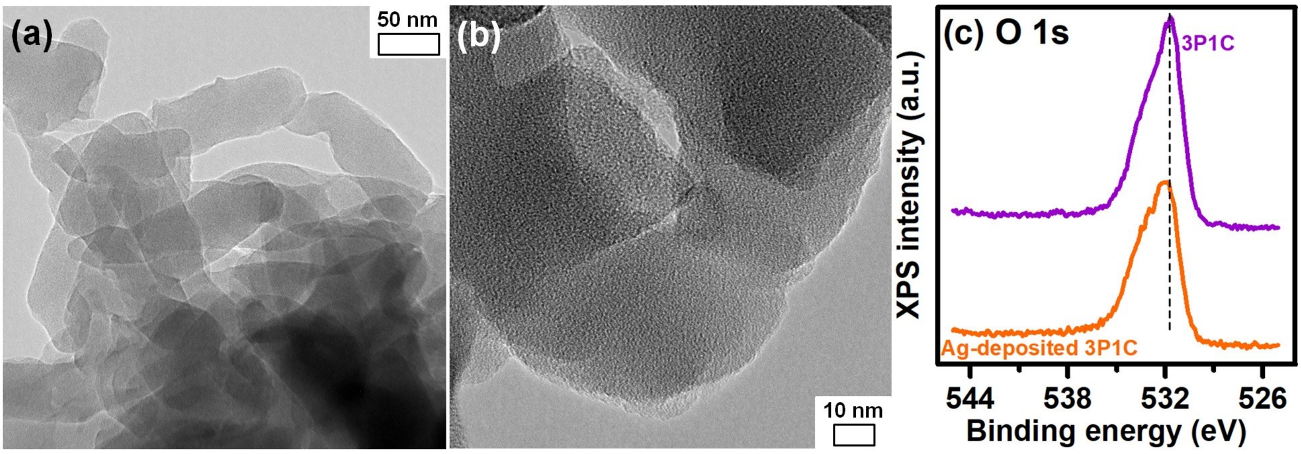

Figure S9 (a) TEM and (b) HRTEM images of 3P1C after the photocatalytic H_2O_2 production with the addition of IPA. (c) XPS spectra of O 1s level for 3P1C sample before (3P1C) and after (Ag-deposited 3P1C) the photocatalytic H_2O_2 production in a solution containing $AgNO_3$ as a sacrificial agent.

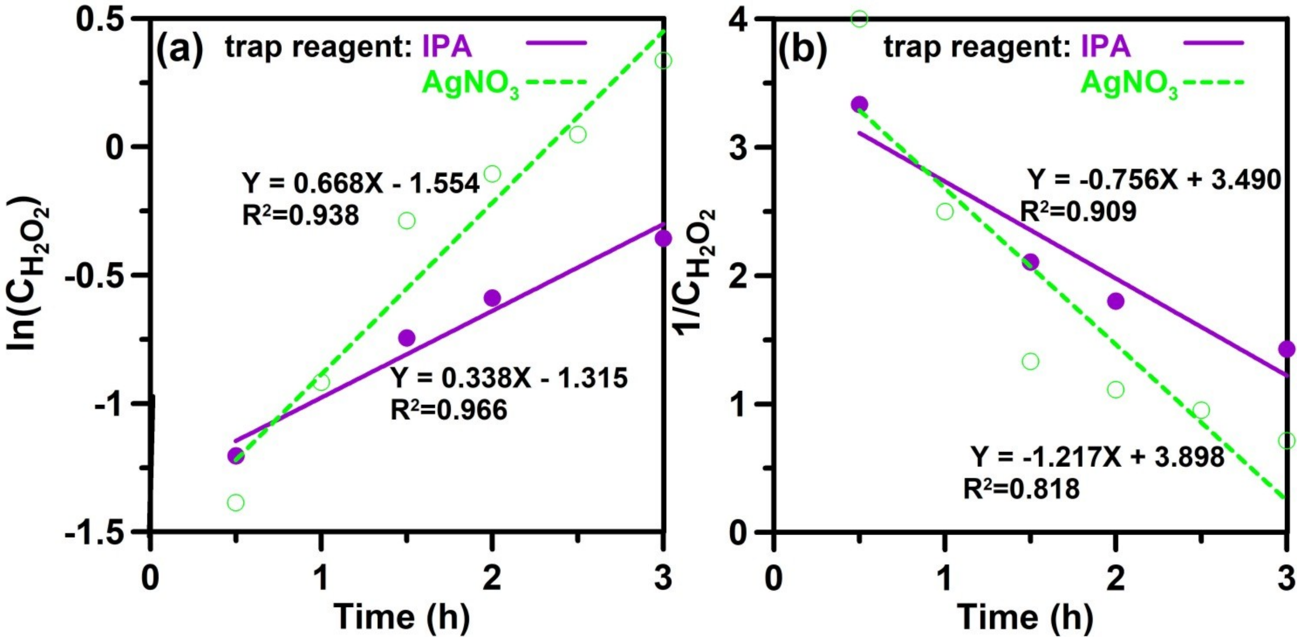

Figure S10 (a) Pseudo-first-order and (b) second-order reaction kinetic plot of the photocatalytic H_2O_2 production using 3P1C in the presence of IPA and $AgNO_3$ as trap reagents.