

Supporting Information

Hierarchical Nanowire Arrays Based on Carbon Nanotubes and Co_3O_4 decorated ZnO
for Enhanced Photoelectrochemical Water Oxidation

Mu Li,^{ab} Kun Chang,^b Tao Wang,^b Lequan Liu,^c Huabin Zhang,^b Peng Li,^{*b} and Jinhua
Ye^{*abc}

^aGraduate School of Chemical Science and Engineering, Hokkaido University, Sapporo
060-0814 (Japan) E-mail: Jinhua.YE@nims.go.jp

^bEnvironmental Remediation Materials Unit and International Center for Materials
Nanoarchitectonics (WPI-MANA), National Institute for Materials Science, 1-1 Namiki,
Tsukuba, Ibaraki 305-0044 (Japan) Li.Peng@nims.go.jp

^cTU-NIMS Joint Research Center, School of Material Science and, Engineering, Tianjin
University, 92 Weijin Road, Tianjin (P.R. China)

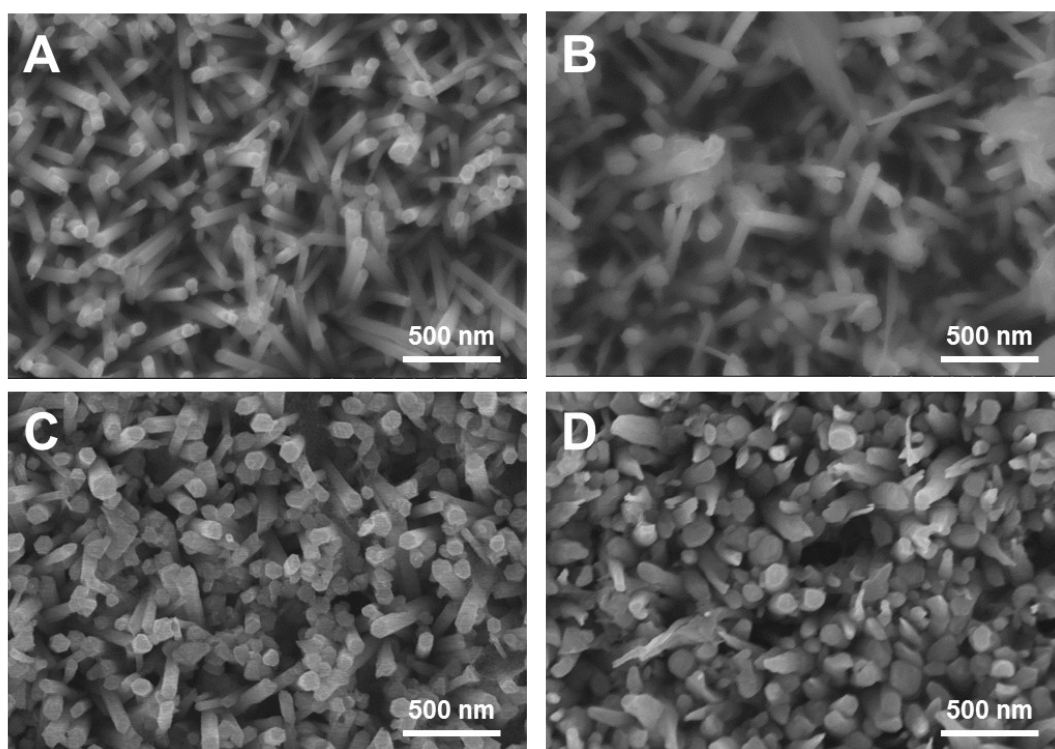


Figure S1. SEM images of ZnO NWs prepared in different hydrothermal synthesis conditions: (A) 0.04 M, (B) 0.05 M, (C) 0.06 M and (D) 0.07 M zinc nitrate and hexamethylenetetramine (HMT).

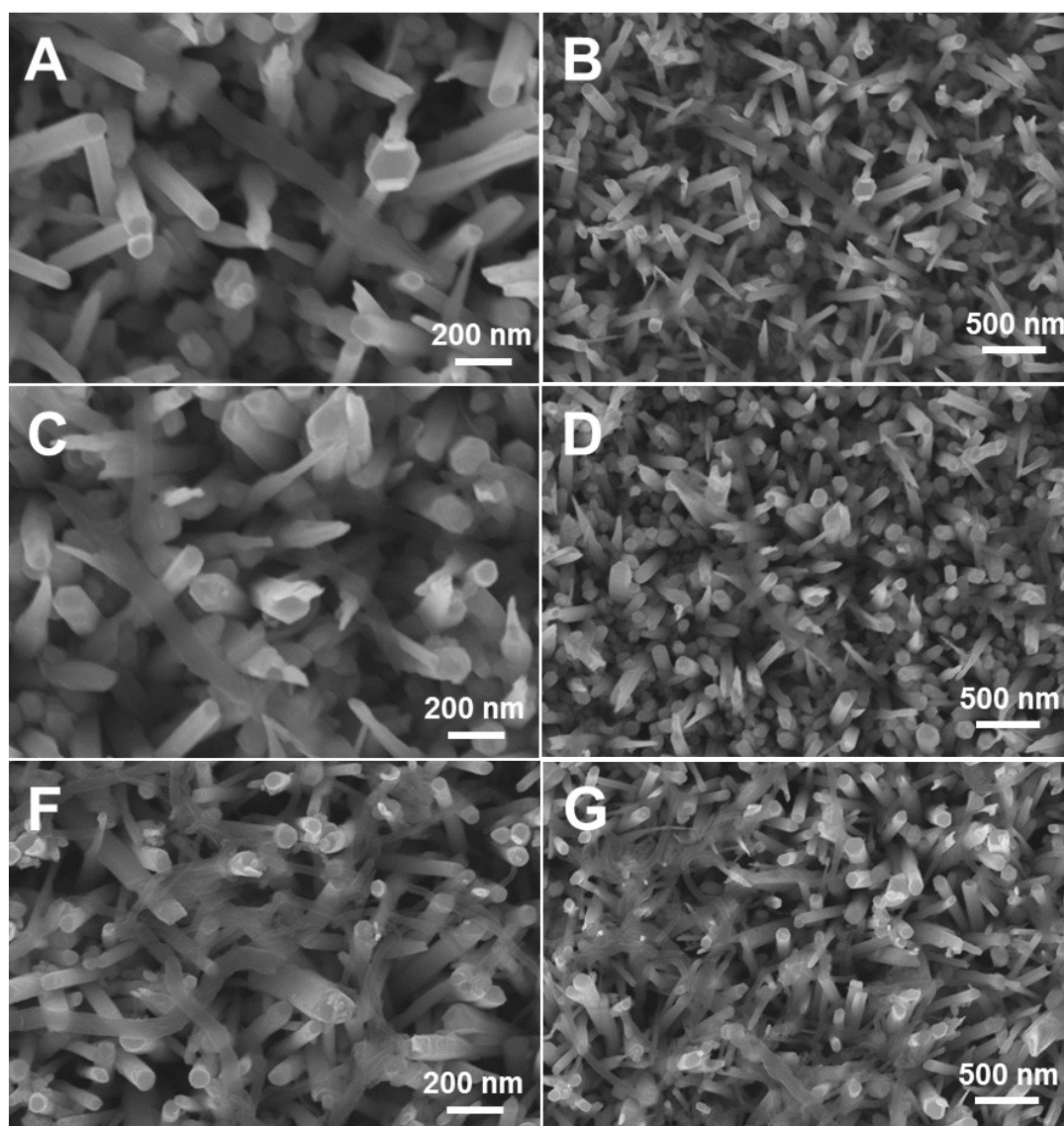


Figure S2. SEM images of CNTs-ZnO NWs prepared in different concentrations of CNTs aqueous solution: (A), (B) 0.25 mg mL⁻¹; (C), (D) 0.50 mg mL⁻¹; (F), (G) 1.00 mg mL⁻¹.

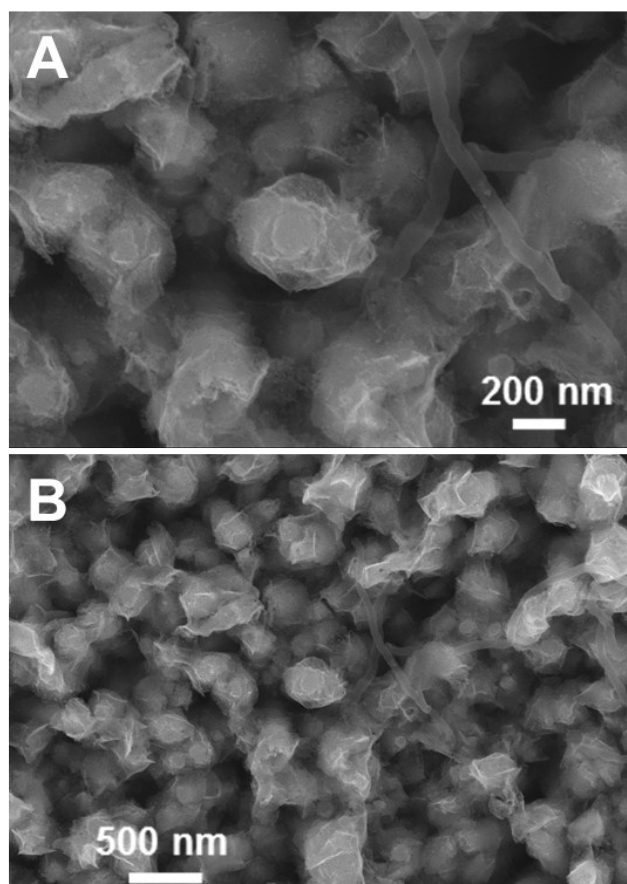


Figure S3. SEM images of CNTs-ZnO-Co₃O₄ NWs with the electrosynthesis duration extended 70s.

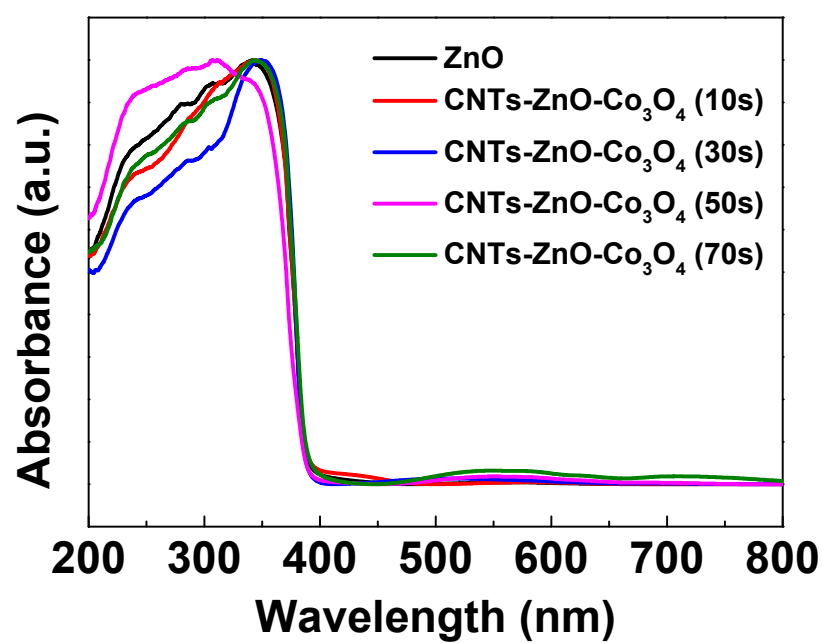


Figure S4. UV-vis absorption spectra of CNTs-ZnO-Co₃O₄ NWs arrays with various electrodeposition durations.

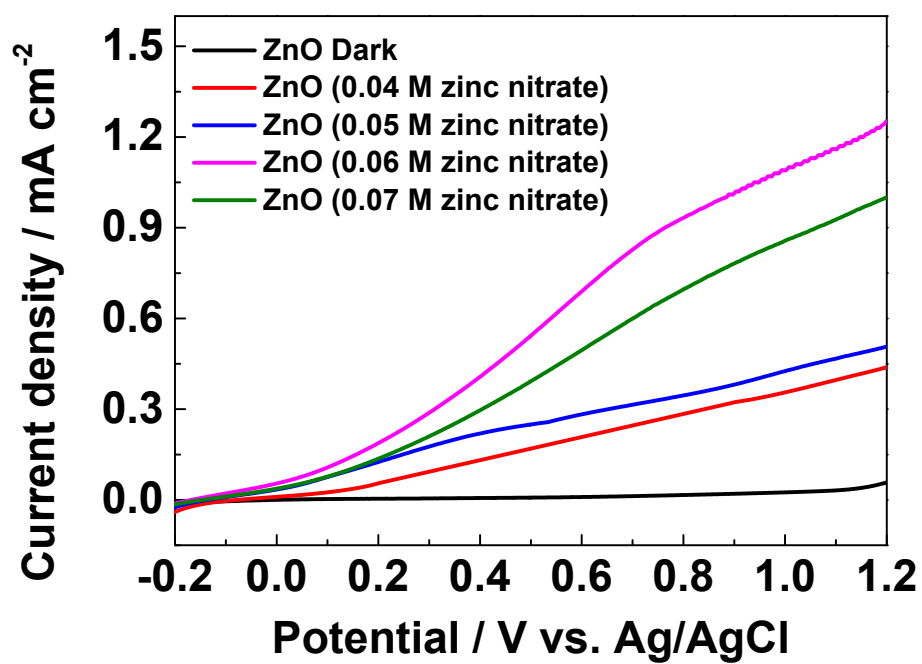


Figure S5. Current-voltage curves of pristine ZnO NWs prepared in different hydrothermal synthesis conditions.

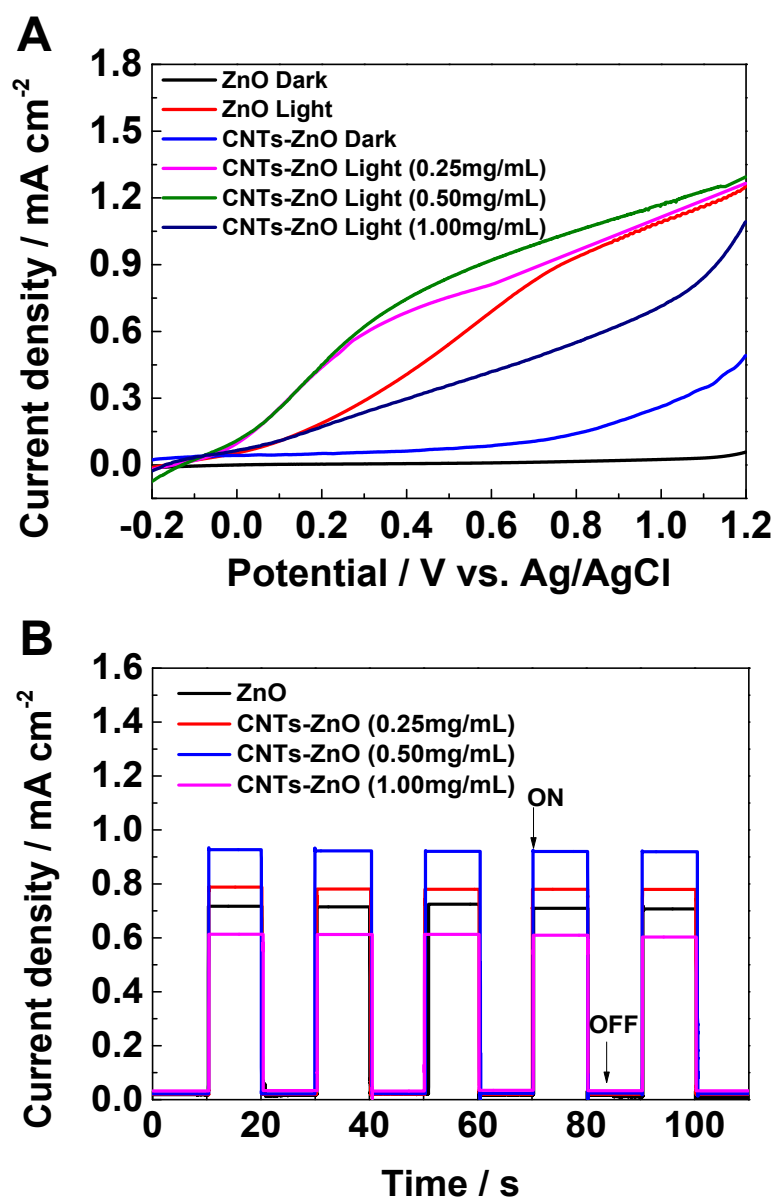


Figure S6. (A) Current-voltage curves and (B) amperometric I-t curves measured at 0.6V of CNTs-ZnO NWs prepared in different concentrations of CNTs aqueous solution.

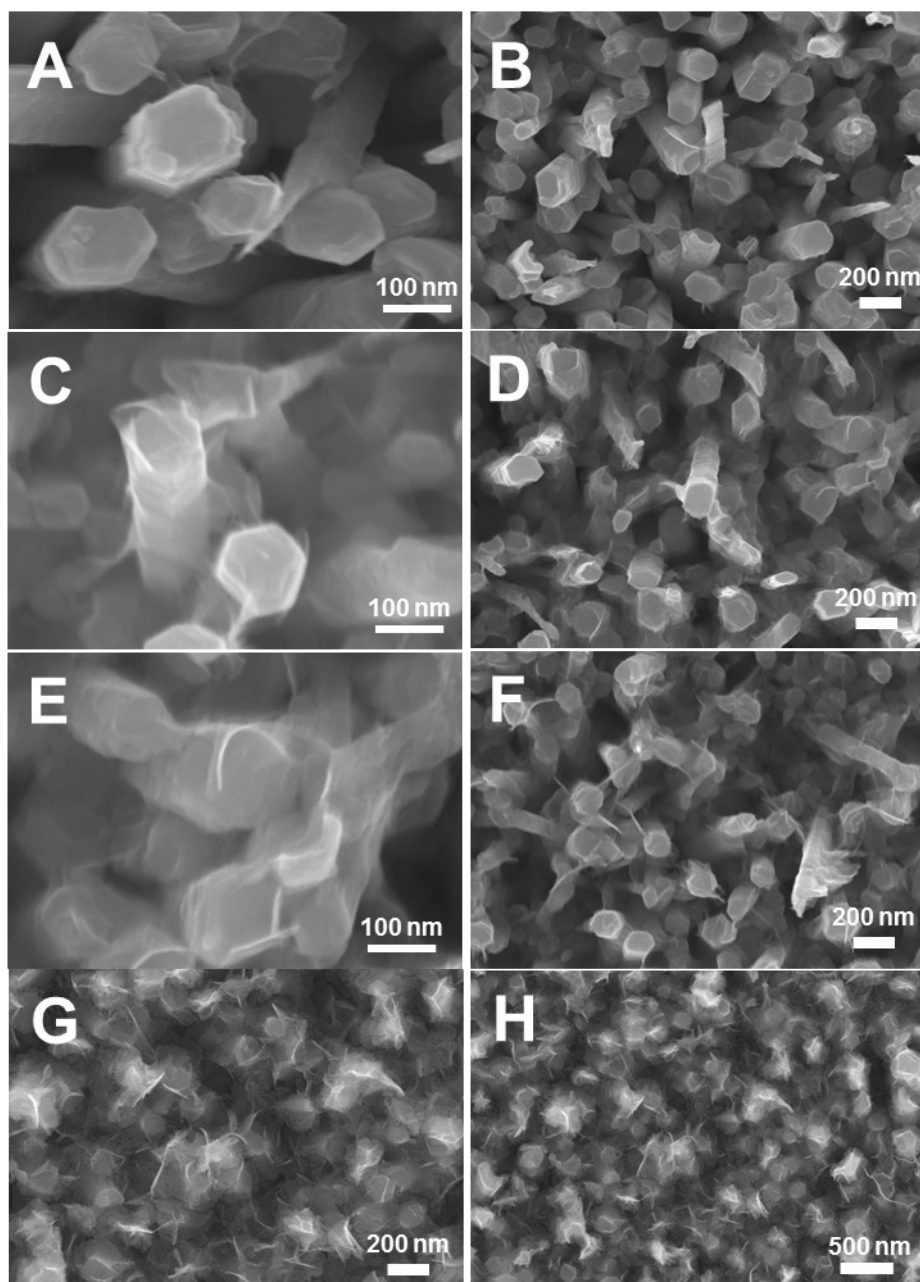


Figure S7. SEM images of $\text{Co}_3\text{O}_4\text{-ZnO}$ NWs arrays with various electrodeposition time: (A), (B) 10s; (C), (D) 30s; (E), (F) 50s and (G), (H) 70s.

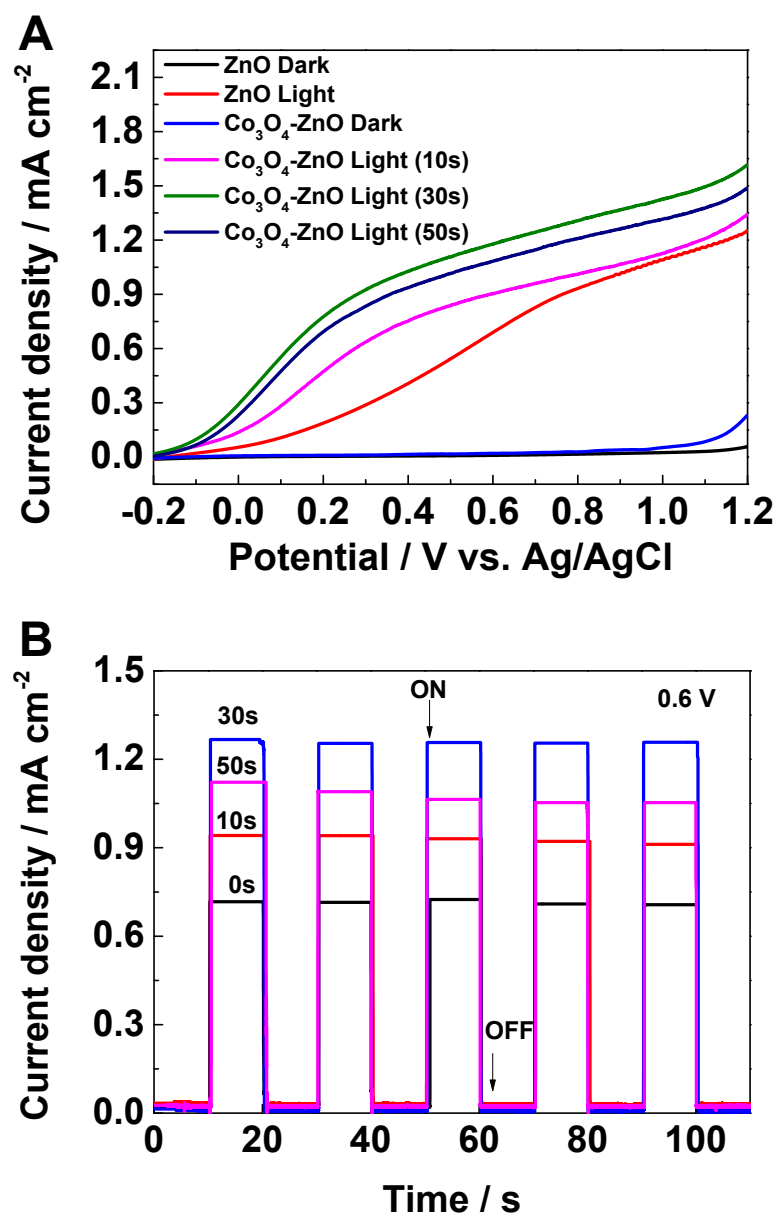


Figure S8. (A) Current-voltage curves and (B) amperometric I-t curves measured at 0.6V of Co_3O_4 -ZnO NWs prepared in various electrodeposition time.

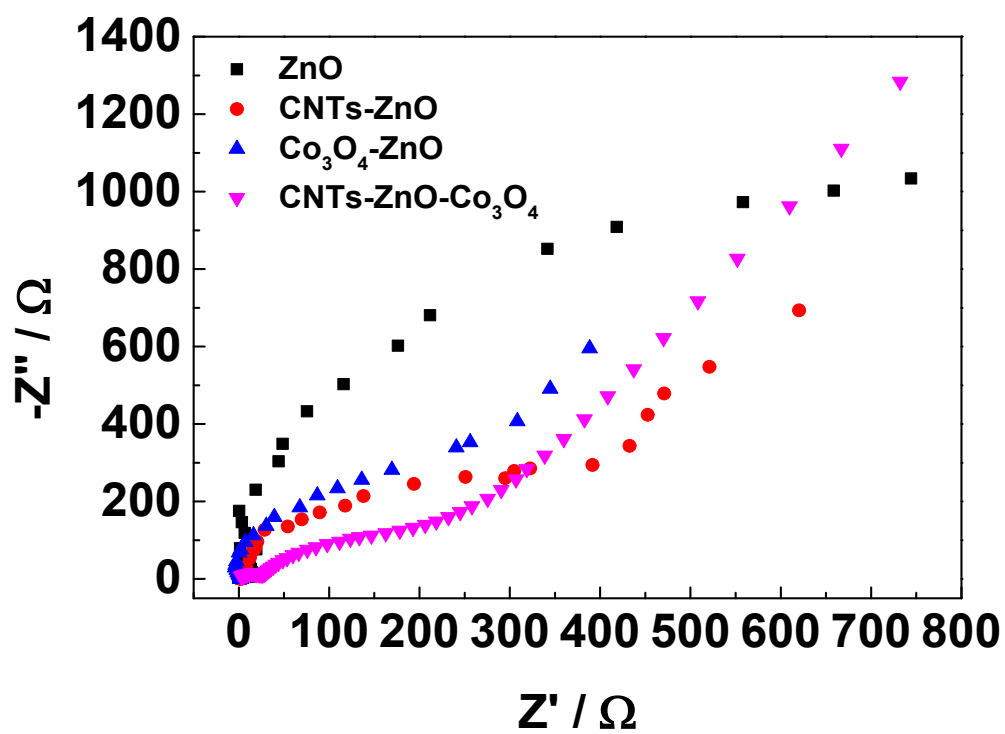


Figure S9. EIS plots of the pristine ZnO NWs, binary CNTs-ZnO NWs, Co_3O_4 -ZnO NWs and the ternary CNTs-ZnO- Co_3O_4 NWs arrays.

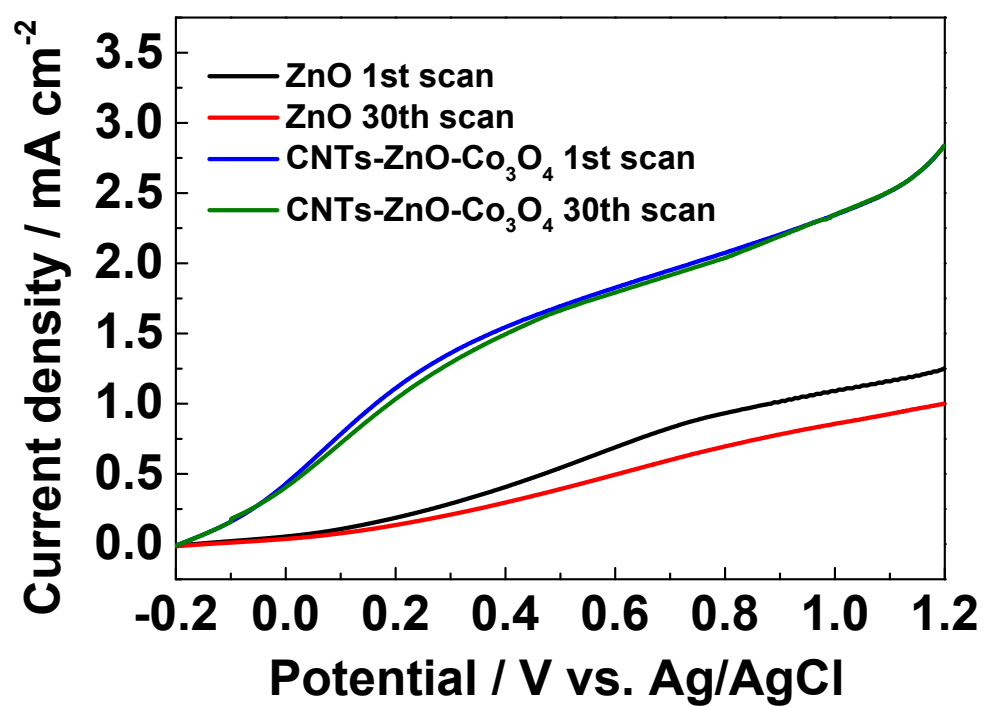


Figure S10. Stability tests for PEC performance of ZnO NWs and CNTs-ZnO-Co₃O₄ NWs after 30 scans.