

Supporting Information

Synthesis of Cu₉S₈/carbon nanotube nanocomposites with high electrocatalytic activity for oxygen reduction reaction

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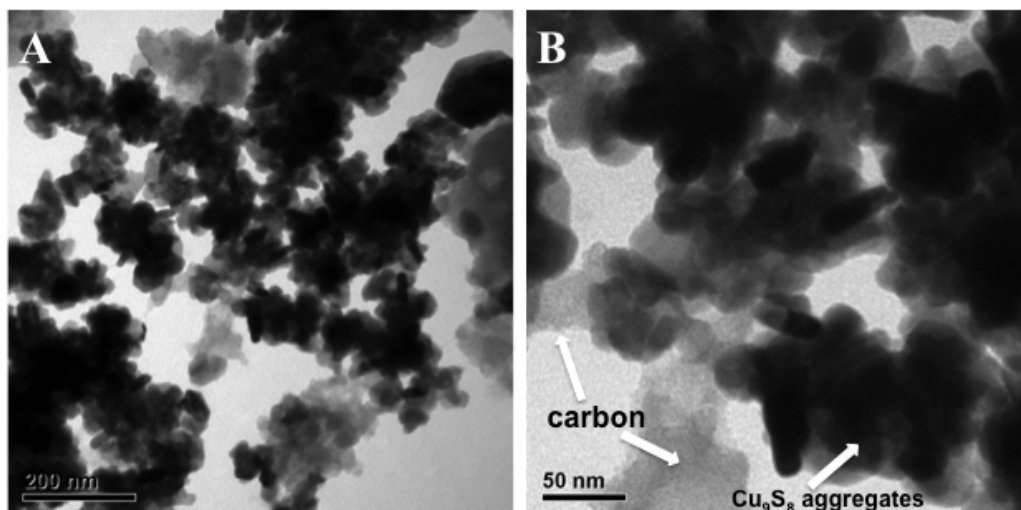


Figure S1. TEM images of $\text{Cu}_9\text{S}_8/\text{C}$ NCs at (A) low and (b) high magnifications.

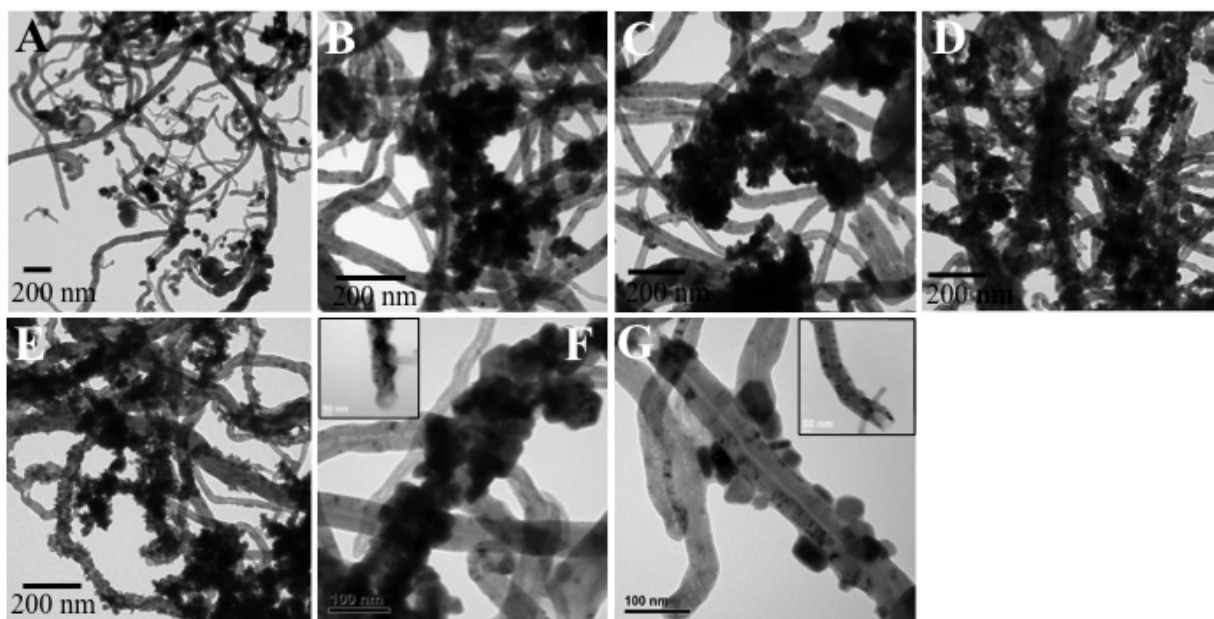


Figure S2. TEM images of Cu₉S₈/CNT NCs prepared at different thioacetamide/Cu²⁺ molar ratios of (A) 33.6, (B) 16.8, (C) 8.4, (D) 4.2, and (E) 2.8. (F) and (G) are the HRTEM images of sample (B) and (C). Insets to (F) and (G) are their corresponding HAADF-STEM images.

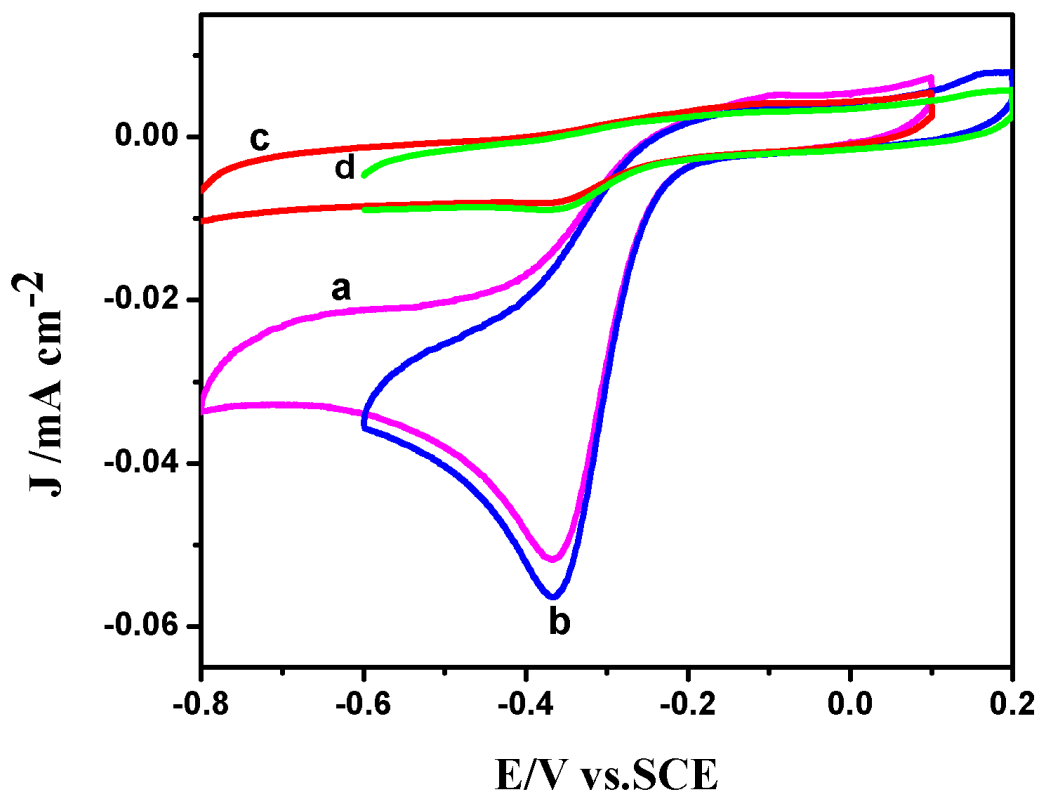


Figure S3. CV curves of Cu₉S₈/CNT electrode recorded in (a-b) O₂- and (c-d) N₂-saturated 0.1 M KOH at a scan rate of 20 mV s⁻¹. Current densities were normalized with respect to the geometric area (0.196 cm²) of the RDE. Cu₉S₈/CNTs were prepared at a thioacetamide/Cu²⁺ molar ratio of 8.4.

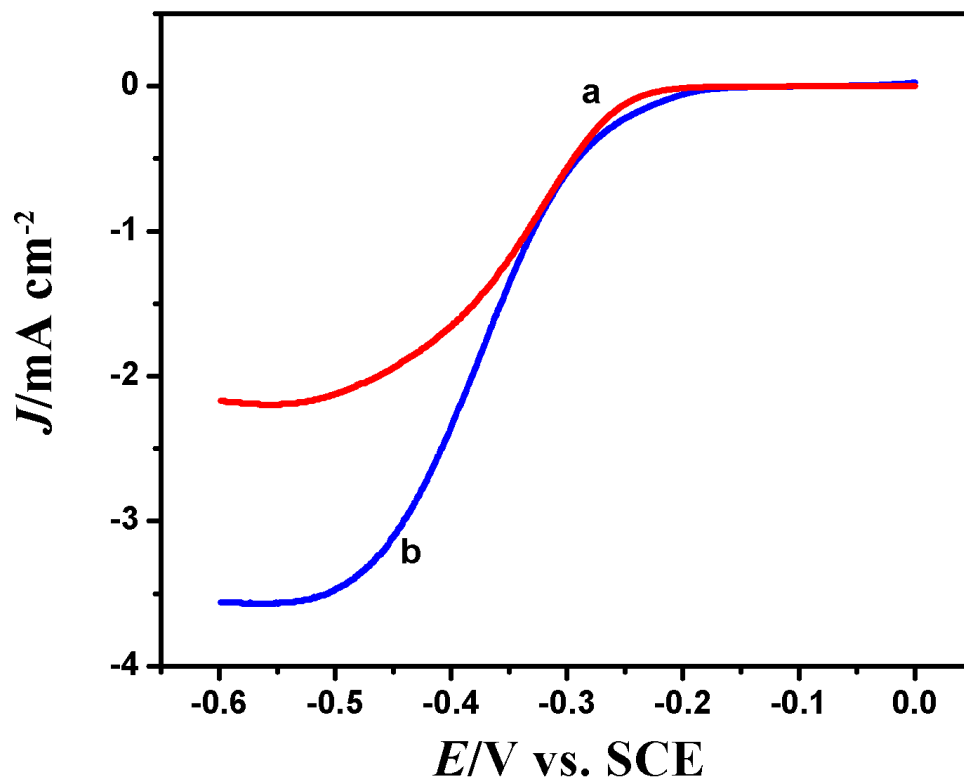


Figure S4. LSVs of (a) CNT and (b) $\text{Cu}_9\text{S}_8/\text{CNT}$ electrodes in O_2 -saturated 0.1 M KOH at 3600 rpm. Current densities were normalized with respect to the geometric area (0.196 cm^2) of the RDE. $\text{Cu}_9\text{S}_8/\text{CNT}$ s were prepared at a thioacetamide/ Cu^{2+} molar ratio of 8.4.

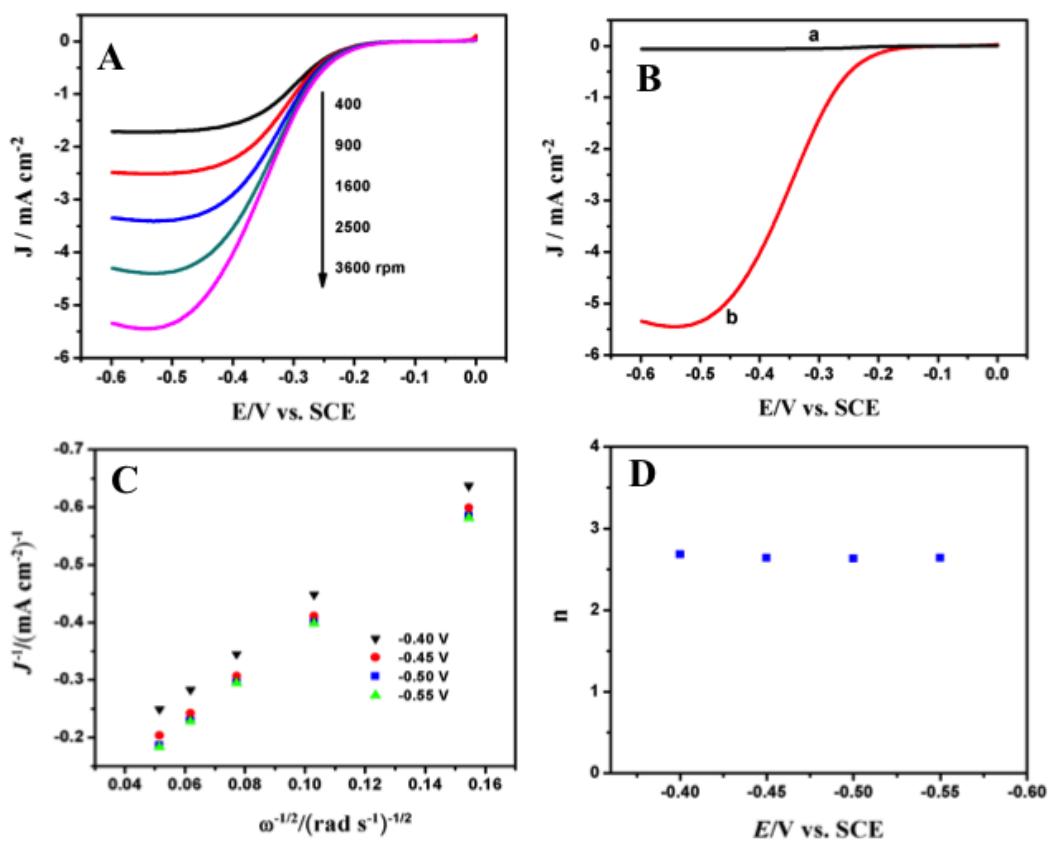


Figure S5. (A) LSVs recorded from a $\text{Cu}_9\text{S}_8/\text{CNT}$ electrode in 0.1 M KOH at different rotation rates. (B) LSVs of $\text{Cu}_9\text{S}_8/\text{CNT}$ electrode in (a) N_2 - and (b) O_2 -saturated 0.1 M KOH at 3600 rpm. (C) Koutecky–Levich plots obtained from the data shown in (A) at -0.4 , -0.45 , -0.5 and -0.55 V and (D) electron transfer number (n) calculated from the data shown in (C) at different potentials. Current densities were normalized with respect to the geometric area (0.196 cm^2) of the RDE. $\text{Cu}_9\text{S}_8/\text{CNTs}$ were prepared at a thioacetamide/ Cu^{2+} molar ratio of 16.8.

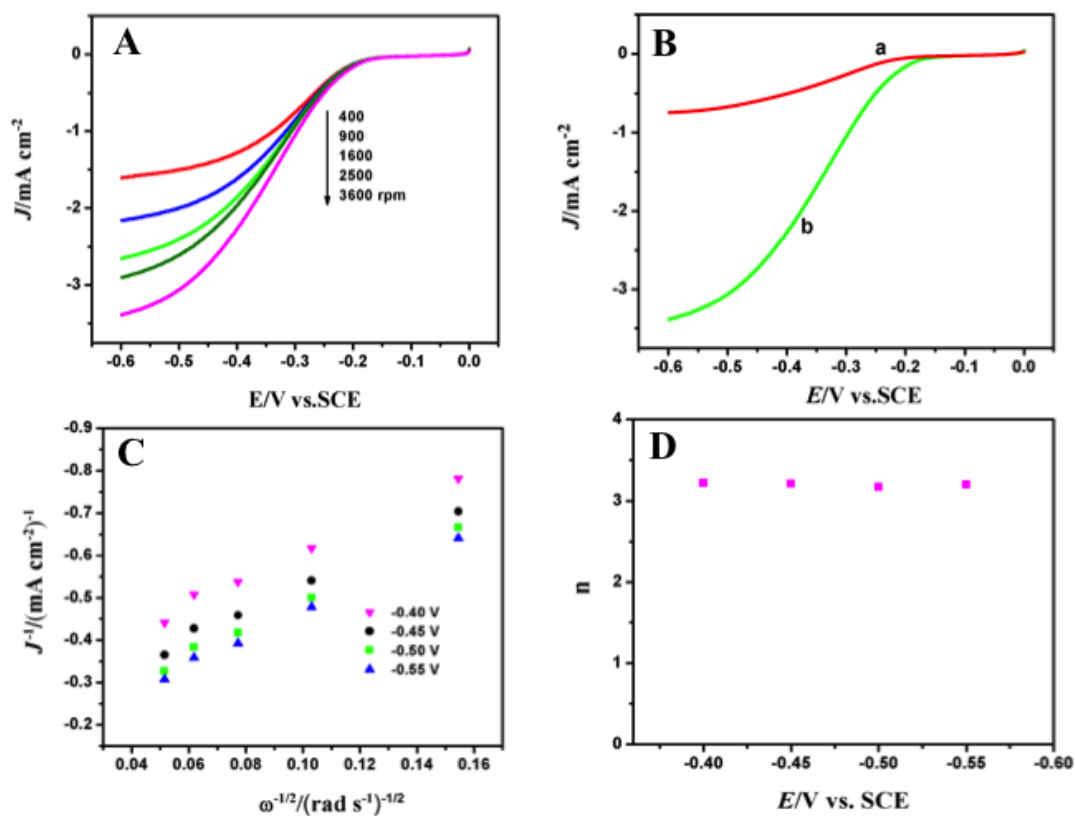


Figure S6. (A) LSVs recorded from a $\text{Cu}_9\text{S}_8/\text{C}$ electrode in 0.1 M KOH at different rotation rates. (B) LSVs of $\text{Cu}_9\text{S}_8/\text{C}$ electrode in (a) N_2 - and (b) O_2 -saturated 0.1 M KOH at 3600 rpm. (C) Koutecky–Levich plots obtained from the data shown in (A) at -0.4, -0.45, -0.5 and -0.55 V and (D) electron transfer number (n) calculated from the data shown in (C) at different potentials. Current densities were normalized with respect to the geometric area (0.196 cm^2) of the RDE. $\text{Cu}_9\text{S}_8/\text{C}$ were prepared at a thioacetamide/ Cu^{2+} molar ratio of 8.4.

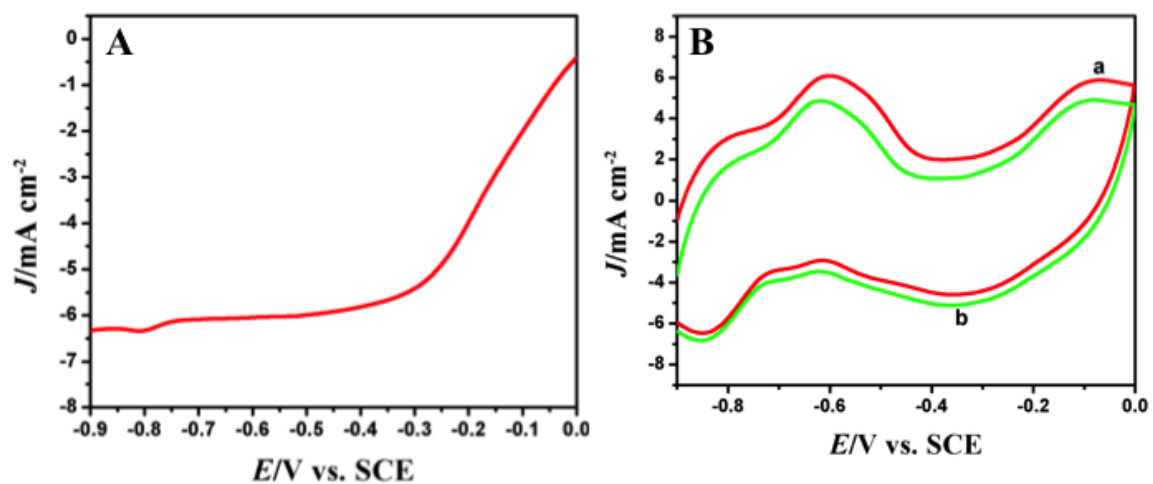


Figure S7. (A) LSV curve of a Pt/C electrode in 0.1 M KOH at a constant rotational rate of 3600 rpm at a scan rate of 1 mV s^{-1} . (B) CV curves of a Pt/C electrode in (a) N_2 - and (b) O_2 -saturated 0.1 M KOH at a scan rate of 20 mV s^{-1} . Current densities were normalized with respect to the geometric area (0.196 cm^2) of the RDE.

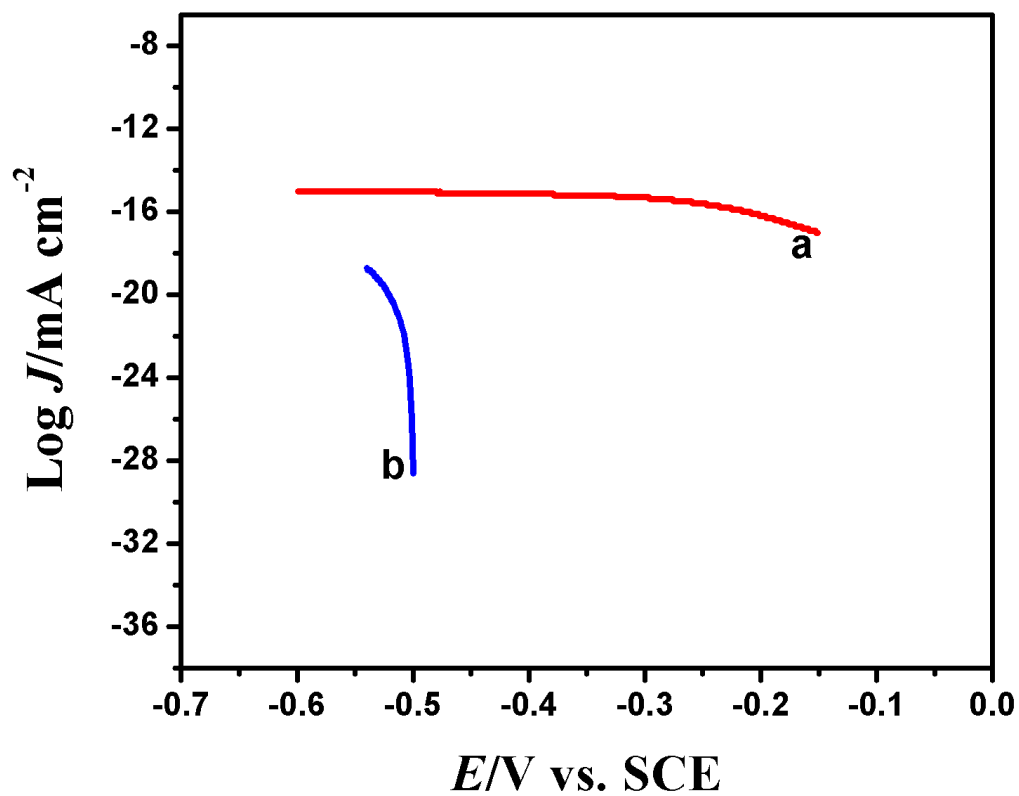


Figure S8. Tafel plots of a Pt/C electrode in 0.1 M KOH in the (a) absence and (b) presence of 1 M MeOH. Scan rate: 1 mV s⁻¹. Rotation rate: 3600 rpm. Current densities were normalized with respect to the geometric area (0.196 cm²) of the RDE.