

Reproducibly Creating Hierarchical 3D Carbon to Study the Effect of Si Surface Functionalization on Oxygen Reduction Reaction

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SUPPORTING INFORMATION

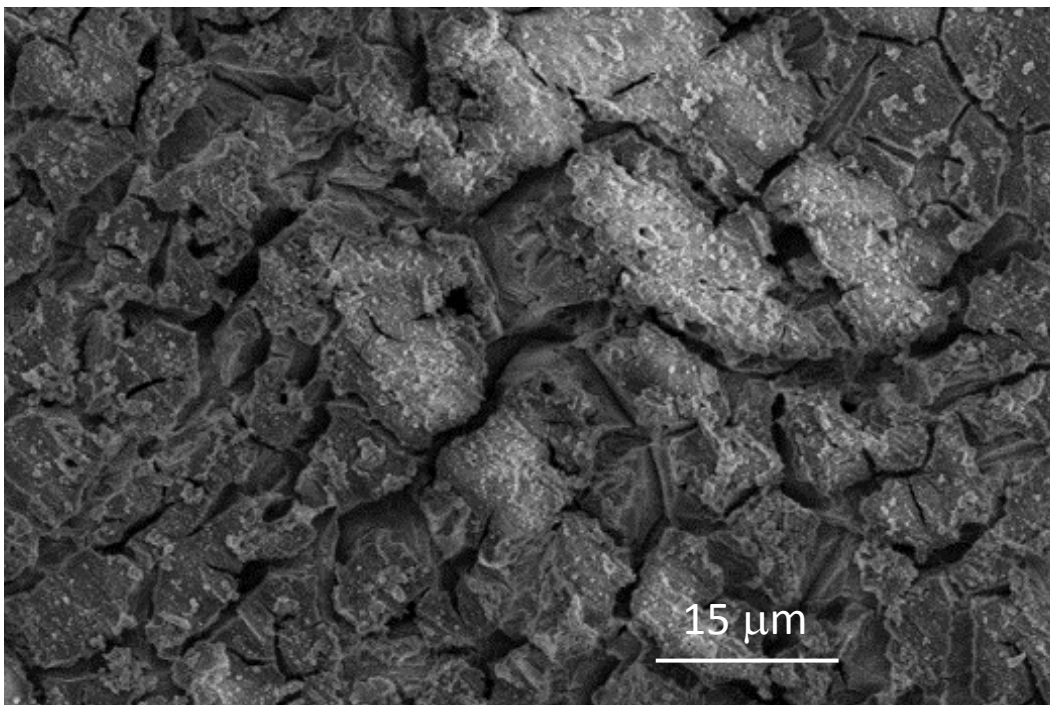


Figure S1. SEM image of the SS316 surface after physical roughening and chemical etching.

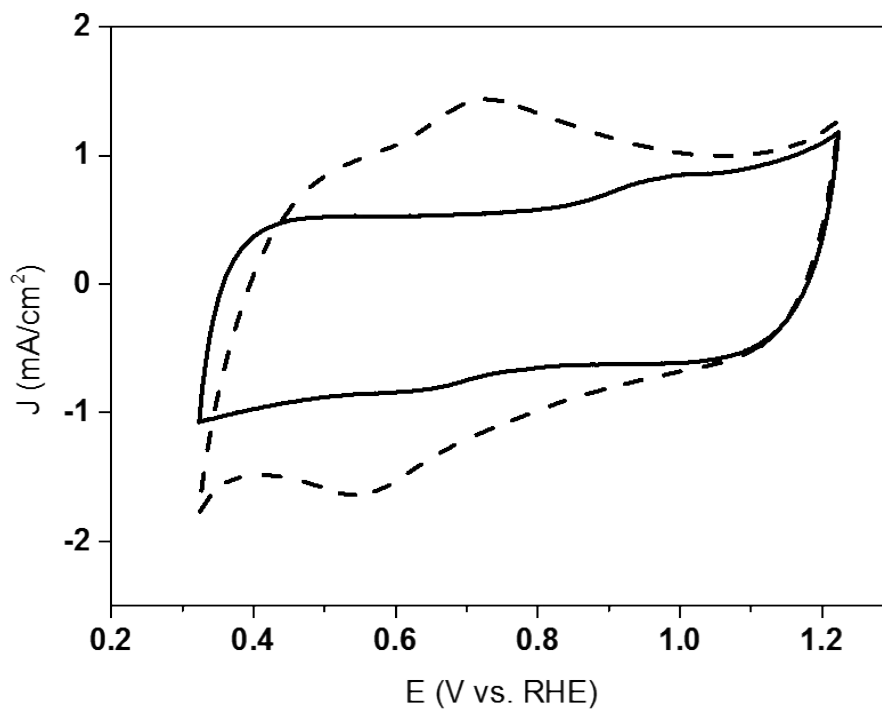


Figure S2. Cyclic voltammetry measurements conducted in 0.1 M KOH solution under saturated N_2 at a scan rate of 20 mV/s. Solid line: CNF-AG. Dashed line: CNF after acid treatment.

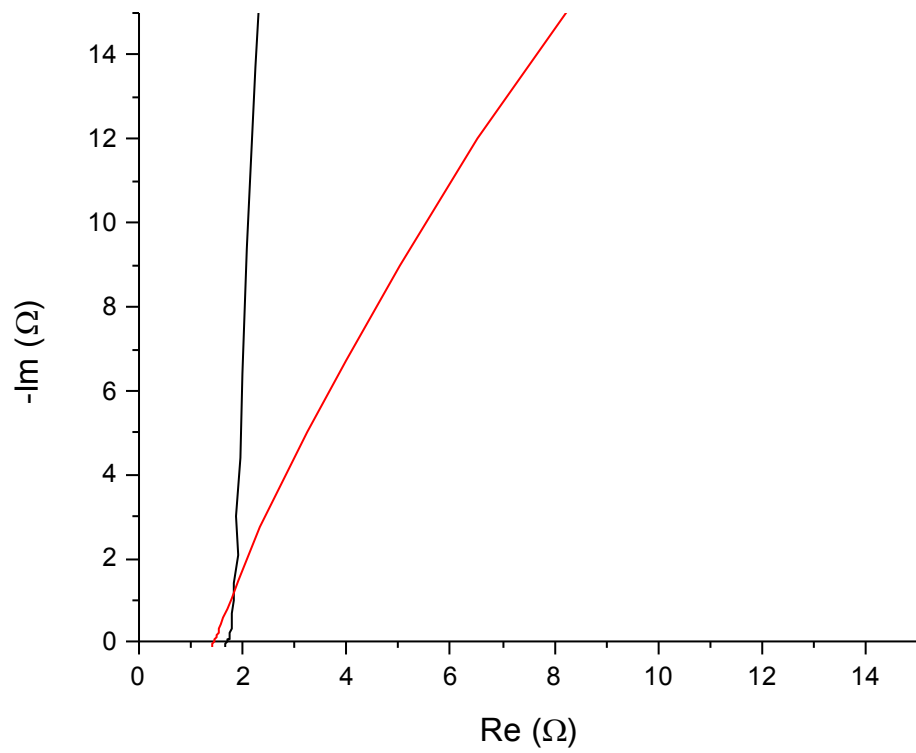


Figure S3. Electrochemical impedance spectra. Red line: SS 316 Black line: CNF-AG

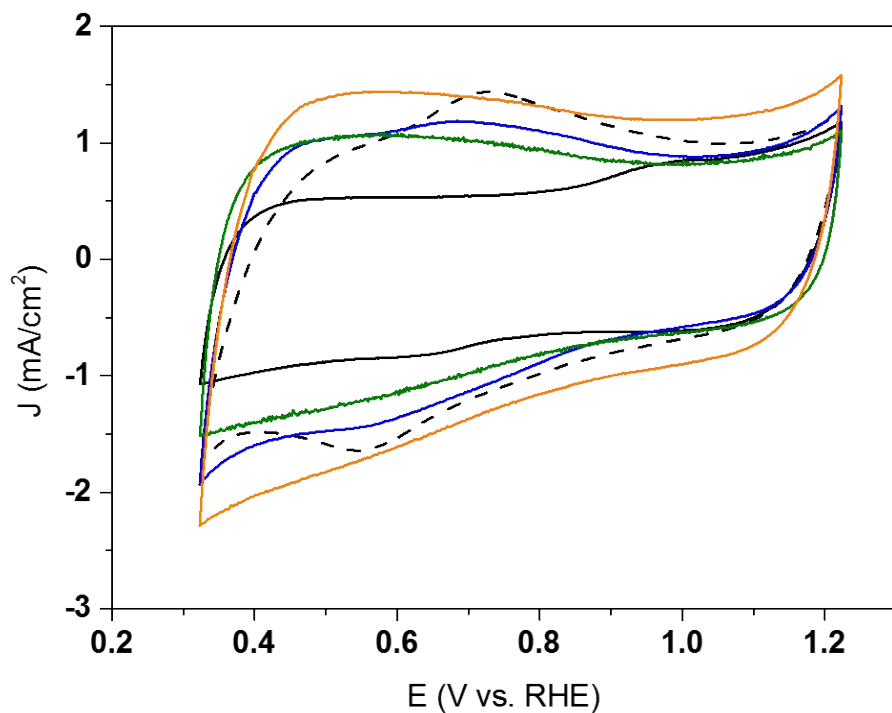


Figure S4. Cyclic voltammety measurements conducted in 0.1 M KOH solution under saturated N_2 at a scan rate of 20 mV/s. Black solid line: CNF-AG. Black dashed line: CNF after acid treatment. Blue solid line: acid treated CNF with Si grafting (CNF-Si). Green solid line: CNF-500. Orange solid line: CNF-Si-500.

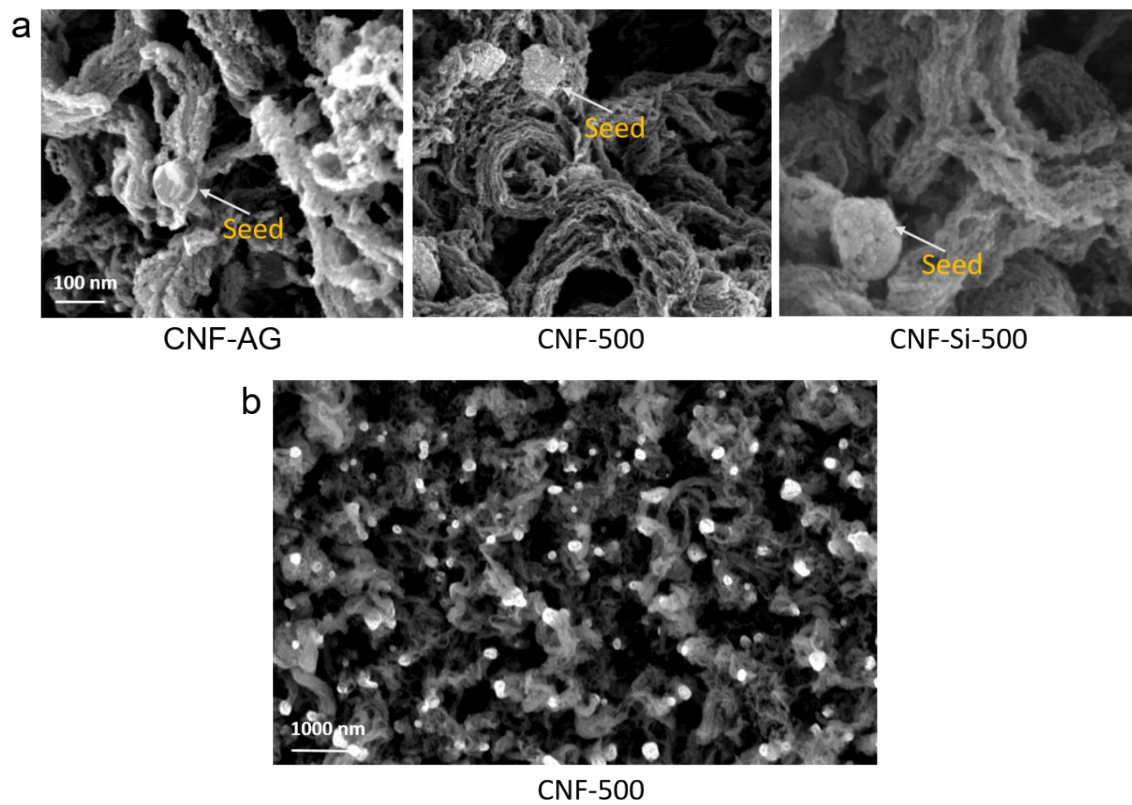


Figure S5. (a) Secondary SEM images. Scale bar: 100 nm. (b) Composite image of secondary and backscattering SEM showing metal seeds in high contrast. Scale bar: 1000 nm.

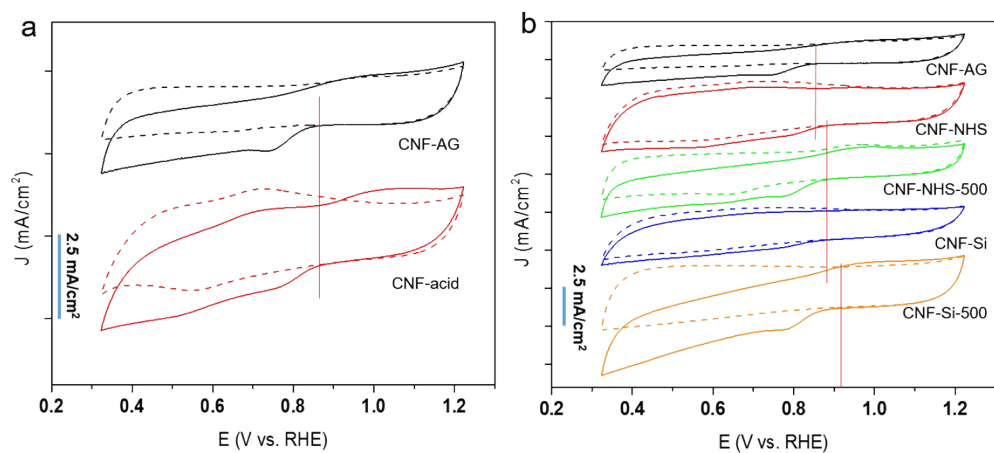


Figure S6. CV results of the CNFs with various treatments. Dashed lines were collected under saturated N₂. Solid lines were collected under saturated O₂. Red vertical lines delineate the onset potential of the ORR.

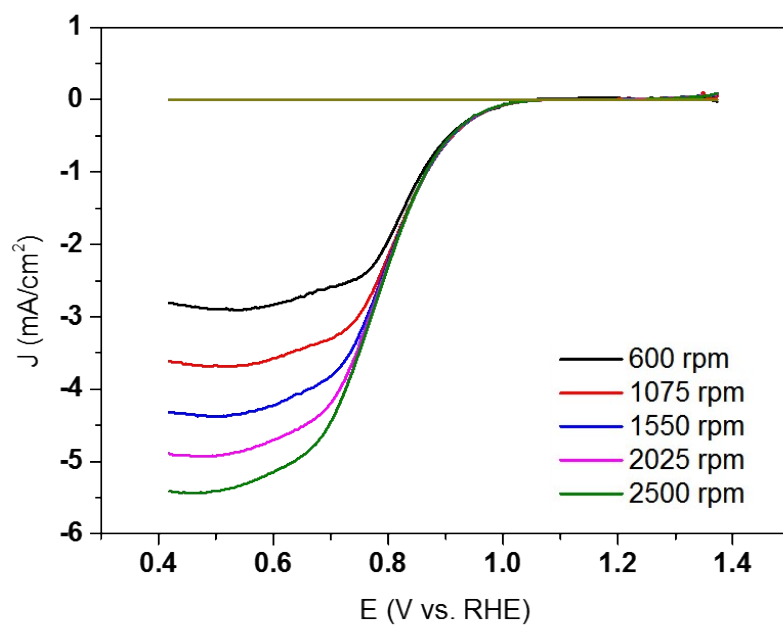


Figure S7. RRDE measurements of the commercial Pt/C catalyst conducted in 0.1 M KOH solution at a scan rate of 10 mV/s. The mass loading of the catalyst was 0.15 mg/cm².

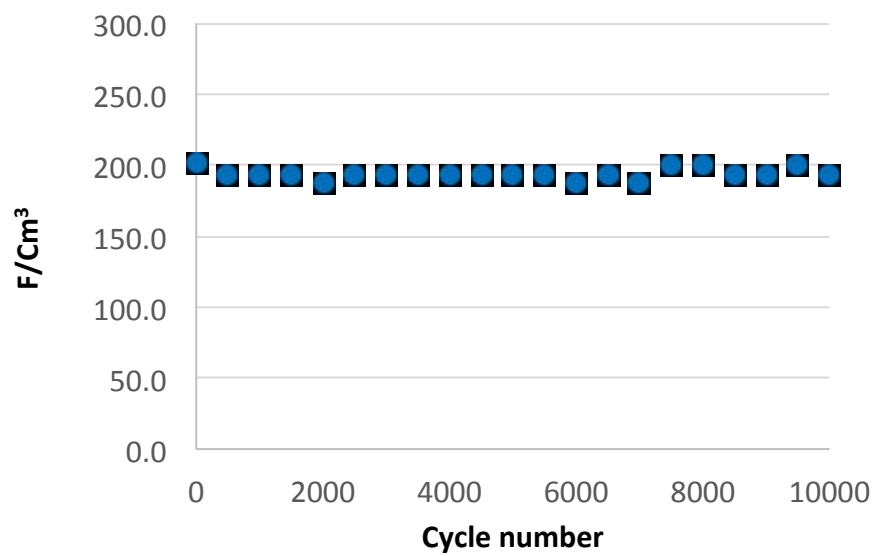


Figure S8. Change of electrochemical surface areas in 2 M HClO₄ 2 mV/sec.