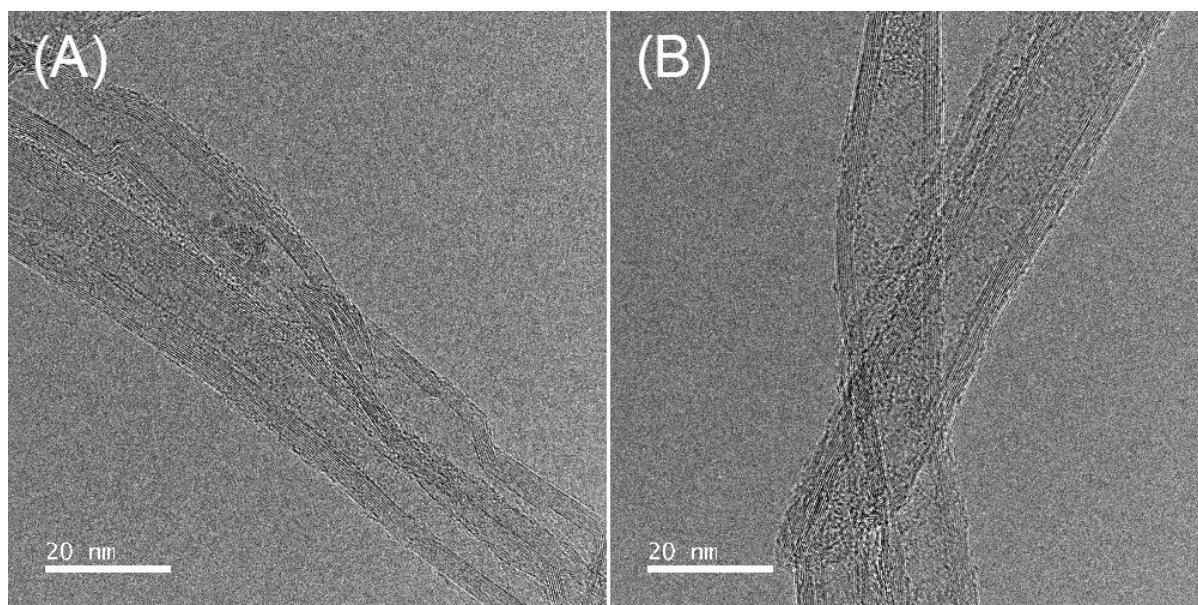


# All carbon hybrid N-doped carbon dots/carbon nanotubes structures as an efficient catalyst for oxygen reduction reaction

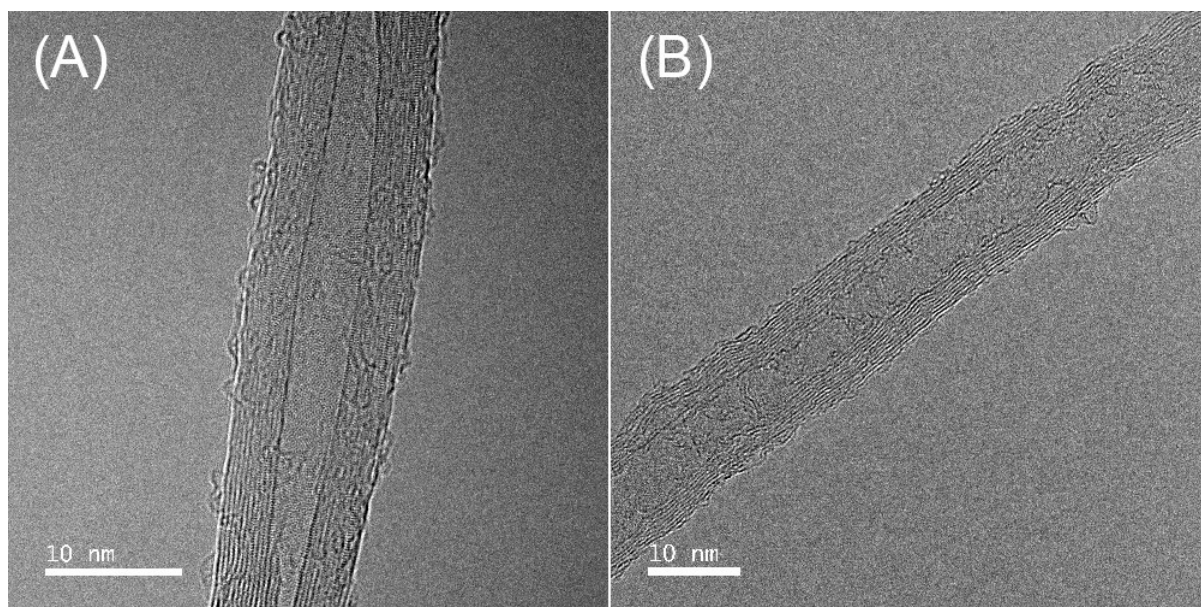
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Republic of Korea

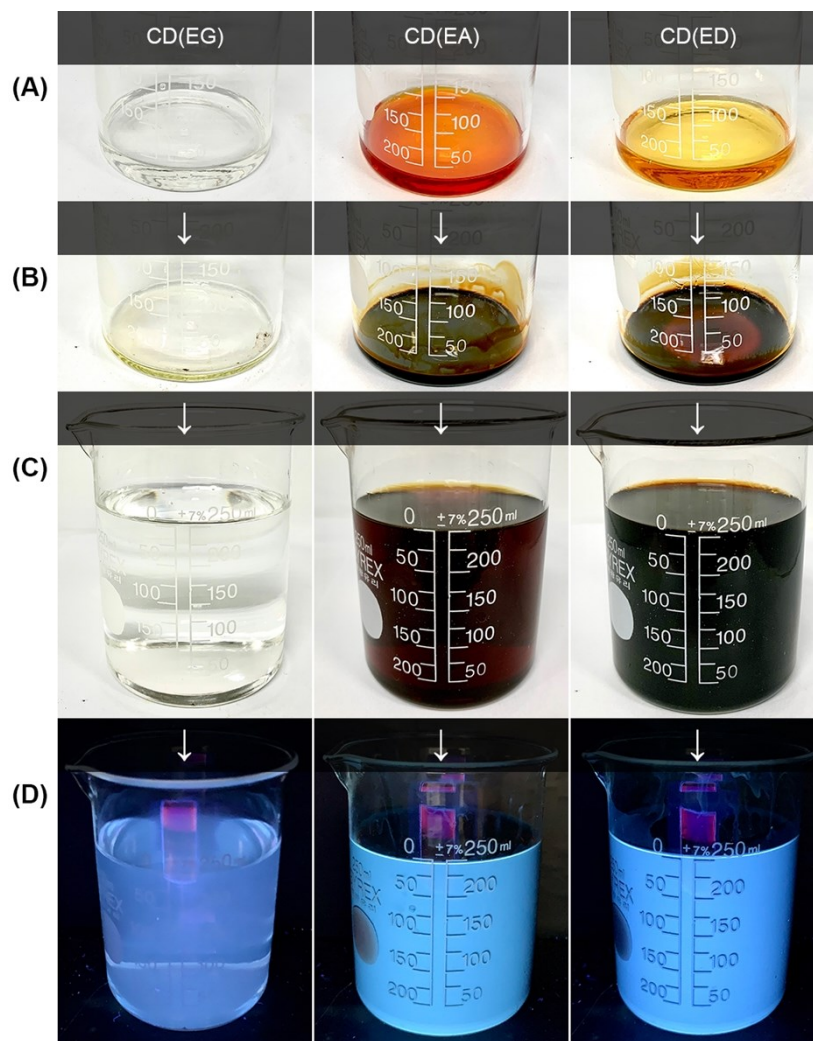
\*E-mail: [junhoshim@daegu.ac.kr](mailto:junhoshim@daegu.ac.kr)



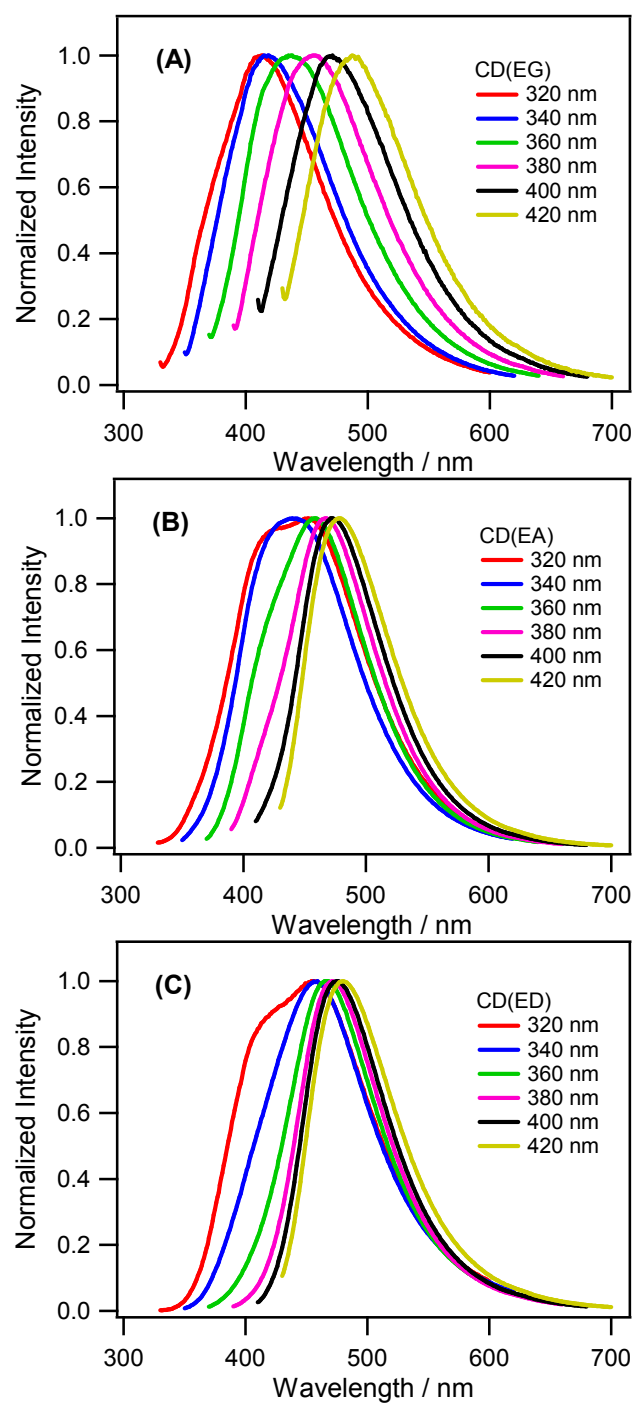
**Figure S1.** TEM images of (A) CD(EG)/CNT and (B) CD(EA)/CNT.



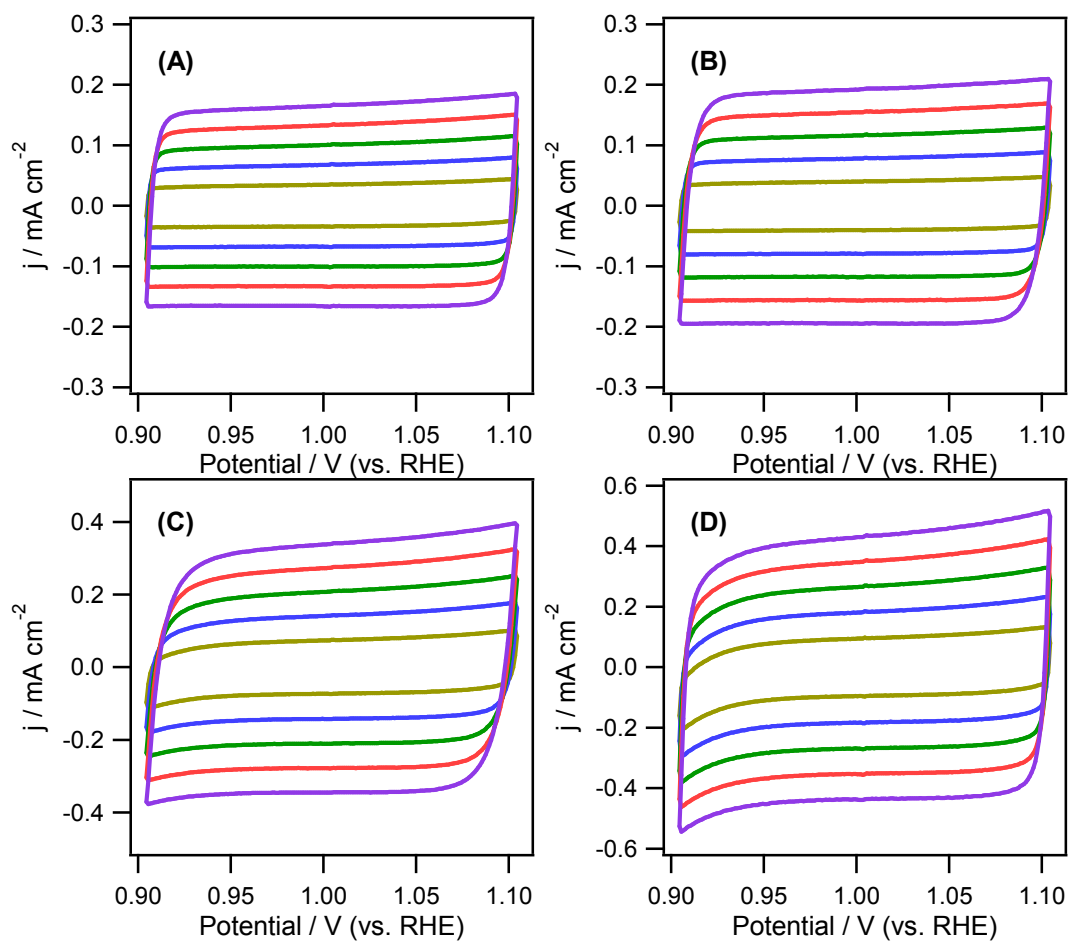
**Figure S2.** HR-TEM images of CNTs (A) before and (B) after the acid-treatment.



**Figure S3.** Photos of (A) CD precursors, (B) after thermal carbonization, (C) after dialysis, and (D) aqueous solution under UV light of 365 nm.



**Figure S4.** Normalized PL spectra of an aqueous solution of (A) CD(EG), (B) CD(EA), and CD(ED) upon excitation from 320 nm to 420 nm in an aqueous solution.



**Figure S5.** CVs of (A) CNTs, (B) CD(EG)/CNT, (C) CD(EA)/CNT, and (D) CD(ED)/CNT in 1.0 M KCl by varying the potential scan rate (10, 20, 30, 40, and 50  $\text{mV s}^{-1}$ )