****

**FIG. S1.** XPS C1s, O1s and N1s spectra for CH\_800/D2 and CH\_800/D2/U(4.16) samples



**FIG. S2.** LSV curves measured at different rotating speeds



**FIG. S3.** Tafel plots for oxygen reduction reaction of CA\_700/B(0.25), CH\_800/D1, CH\_800/D2/U(4.16) and Ketjen Black in O2 saturated 1 M KOH solution, rotation speed of disk electrode is 1600 rpm