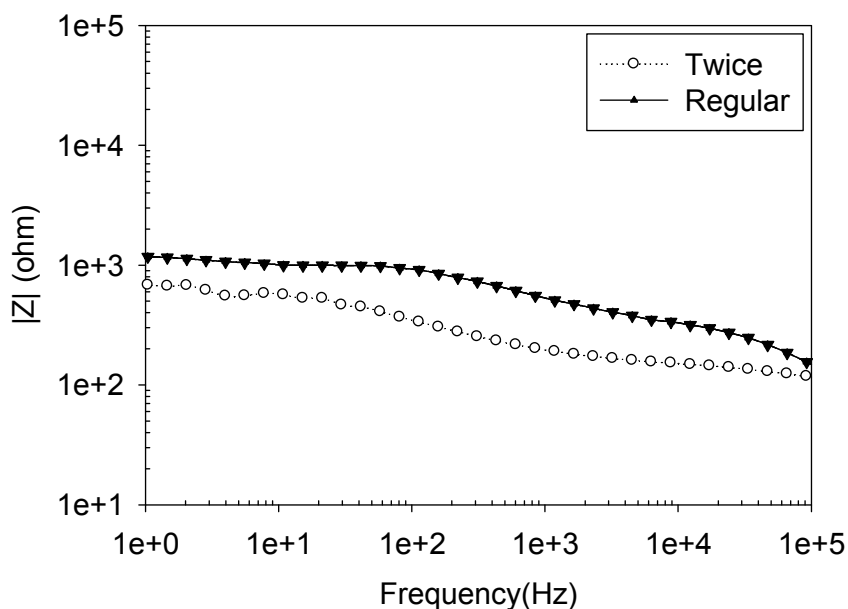


## Supporting Information

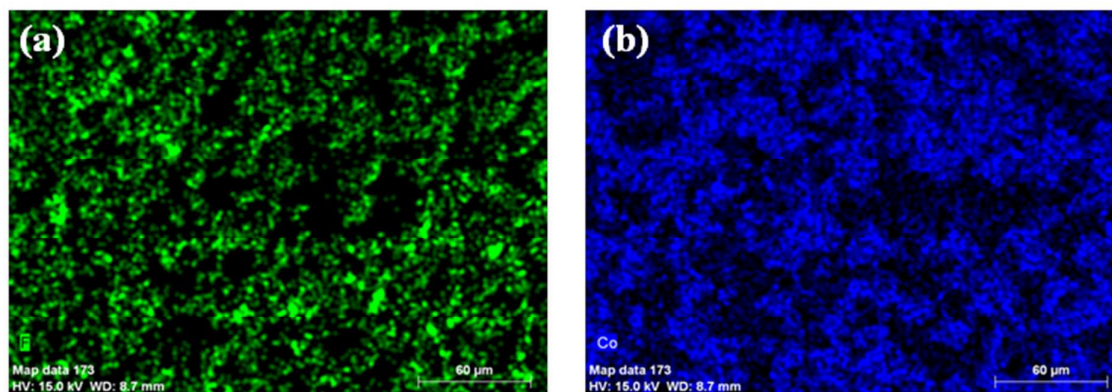
We carried out a supplementary experiment by increasing the content of carbon black in the slurry twice compared with the regular composition ratio (95:2:3) stated in the manuscript. Additionally, we tested reproducibility of the EIS measurement.

Figure S1 presents the Bode plot of carbon conductive specimens which were prepared without agitating. The measurement was conducted on day 0. It turns out that the sample with the higher content of carbon conductive has lower impedance values with respect to frequency. However, the increase is not significant such that percolation threshold is not reached yet.

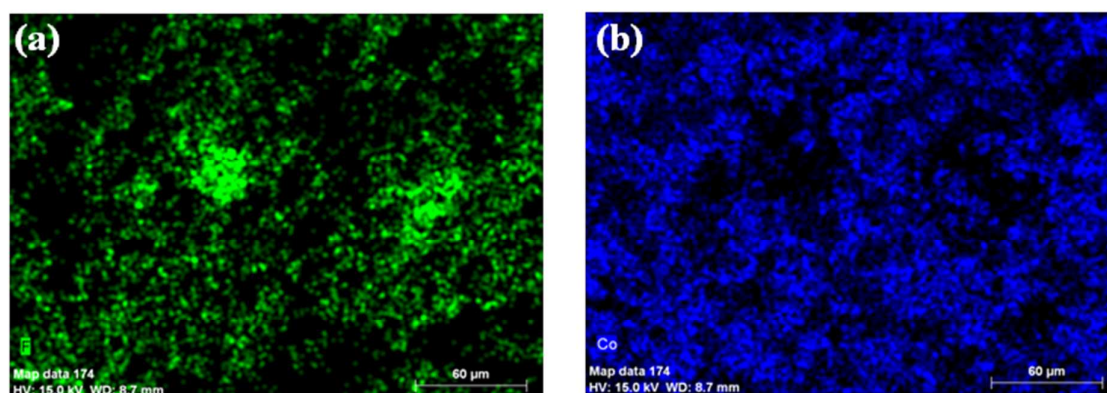


**Figure S1.** Bode plot of carbon conductive additive.

Figures S2 and S3 show the morphological results of day seven slurry without agitation and with agitation, respectively. This morphological observation reveals that the agitated sample has more aggregated internal structure.

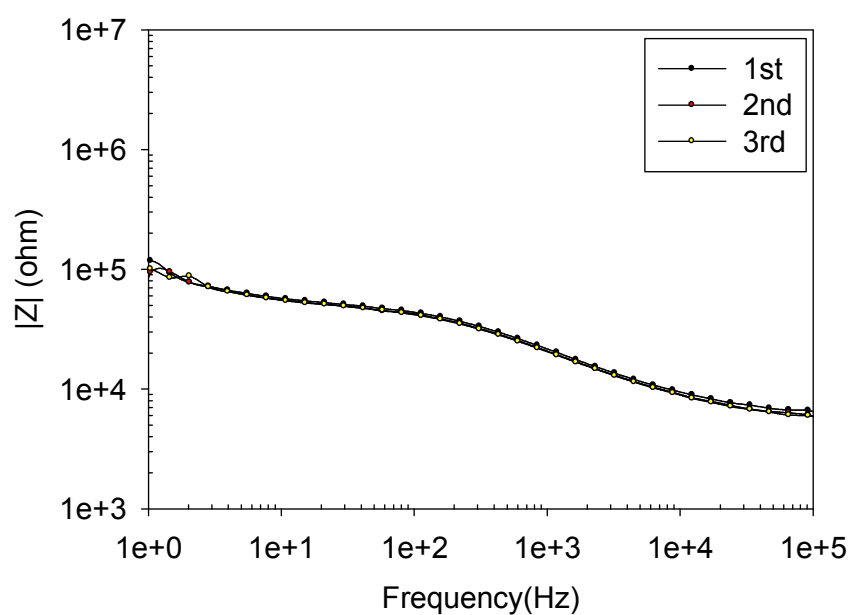


**Figure 2S.** Morphological results of not agitated day seven slurry: (a) EDS mapping of fluorine and (b) EDS mapping of cobalt.



**Figure S3.** Morphological results of agitated day seven slurry: (a) EDS mapping of fluorine and (b) EDS mapping of cobalt.

Figure S4 presents the Bode plot of day seven slurry. We repeated the same experiment three times for testing the reproducibility. The findings show that the EIS measurement of the slurry has good repeatability.



**Figure S4.** Bode plot of slurry.