

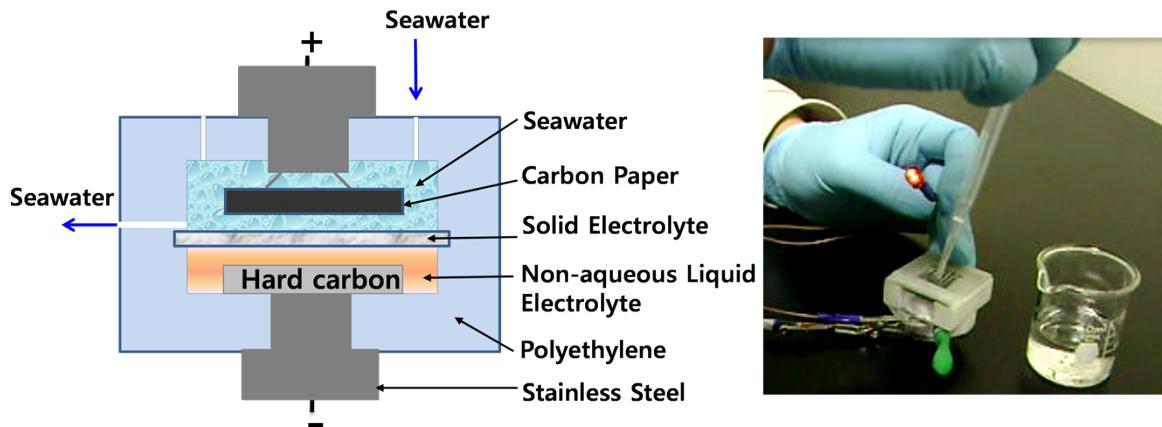
**Supporting Information:**

**Metal-free hybrid seawater fuel cell with an ether-based electrolyte**

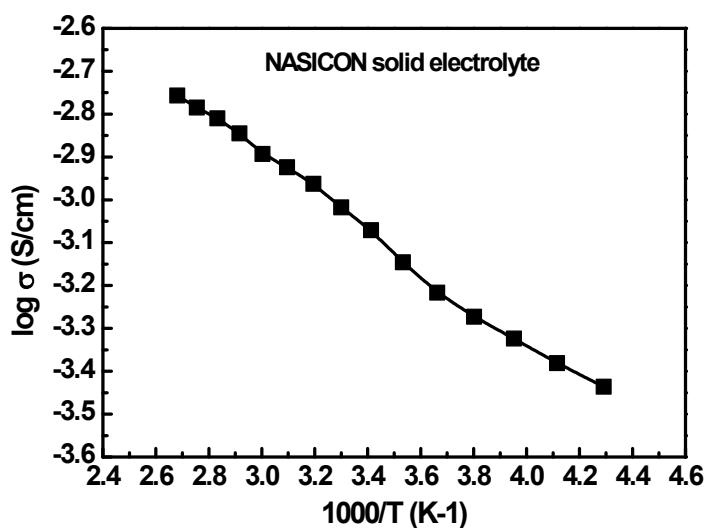
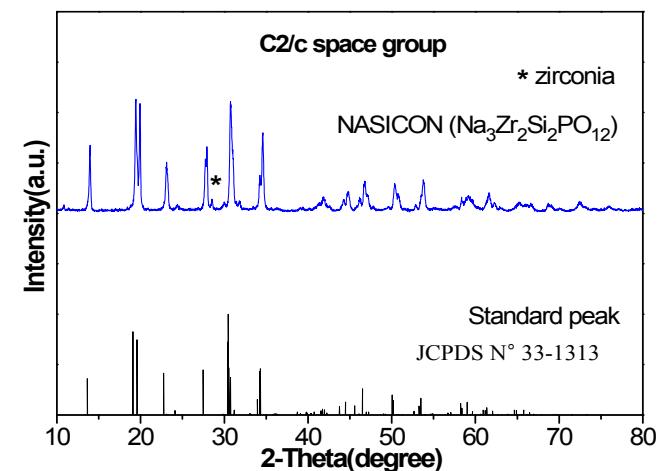
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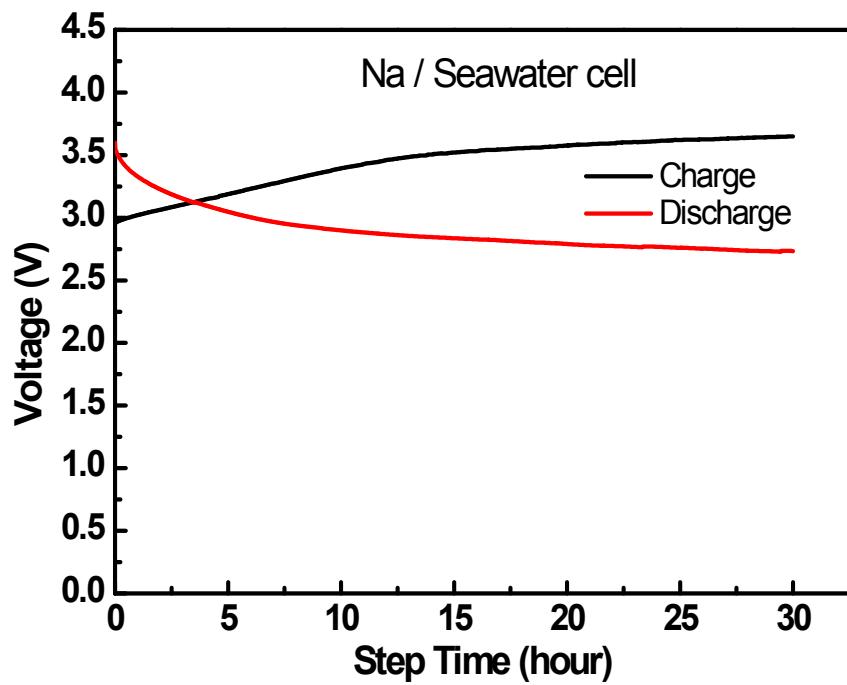
\*Correspondence to [jaekwang@unist.ac.kr](mailto:jaekwang@unist.ac.kr) (J.K. Kim), [ykim@unist.ac.kr](mailto:ykim@unist.ac.kr) (Y. Kim).



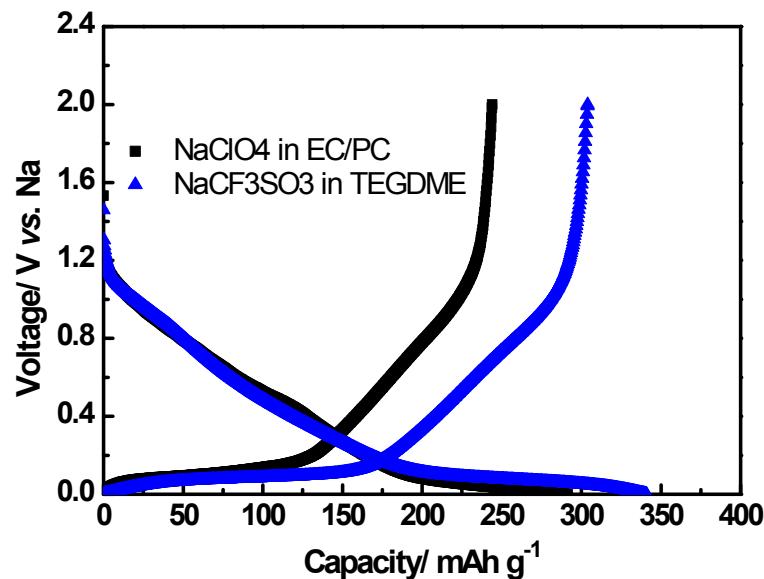
**Fig. S1** Schematic illustration of the metal-free hybrid seawater fuel cell and the image shows the fully assembled cell under test.



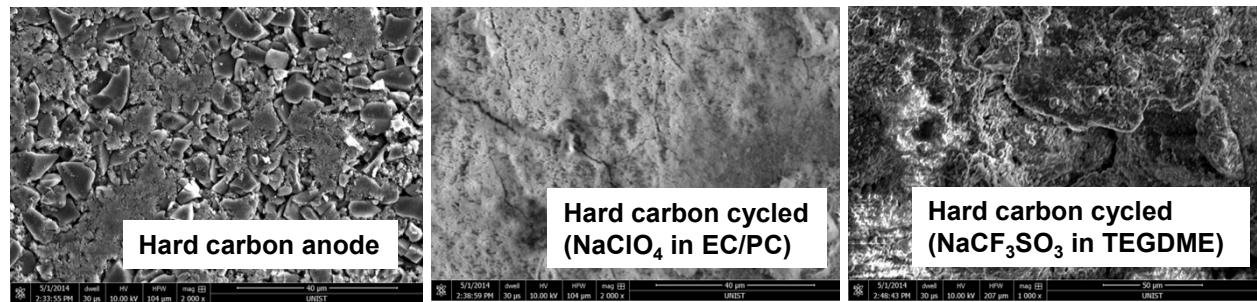
**Fig. S2** X-ray diffraction data and ionic conductivity of NASICON solid electrolyte.



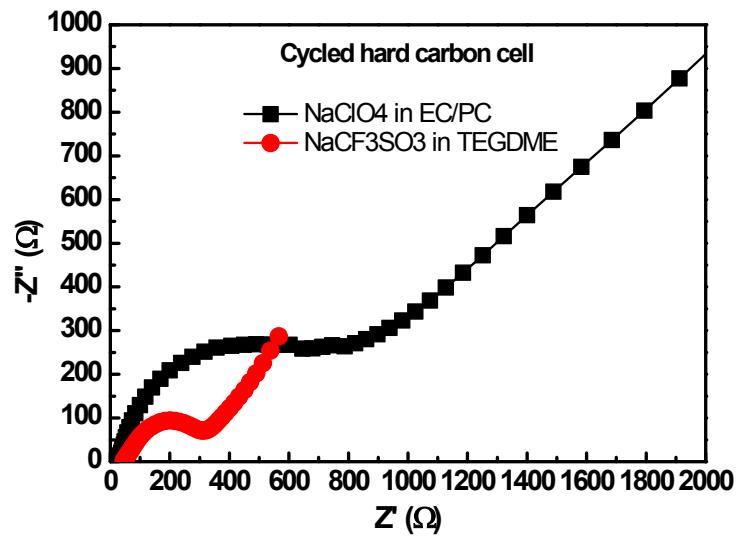
**Fig. S3** Discharge and charge voltage curves of Na/Seawater cell at room temperature (0.05 mA cm<sup>-2</sup>).



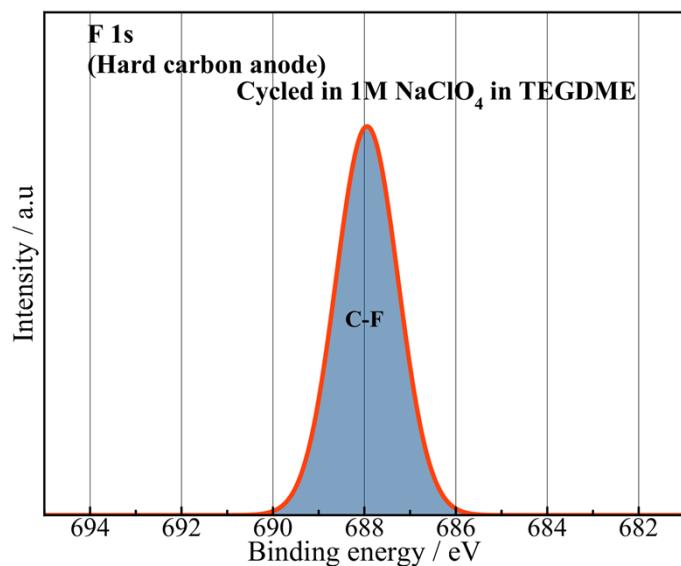
**Fig. S4** Discharge and charge voltage curves of Na/hard carbon cell with two different electrolytes at room temperature ( $0.05 \text{ mA cm}^{-2}$ ).



**Fig. S5** SEM images of hard carbon anode.



**Fig. S6** Nyquist of EIS measurement performed on hard carbon anodes in two different electrolytes.



**Fig. S7** XPS F 1s spectra of the surface of hard carbon anode cycled in 1M NaClO<sub>4</sub> in TEGDME.