

Electronic Supplementary Information for

Mussel-Inspired Polydopamine-treated Composite Electrolytes for Long-Term Operations of Polymer Electrolyte Membrane Fuel Cells

Keun-Hwan Oh^a, Min-Ju Choo^b, Hongkyung Lee^b, Kwang Hyun Park^b, Jung-Ki Park^{a,b,*}, and
Jang Wook Choi^{a,*}

^aGraduate school of EEWS(Energy Environment Water Sustainability)(WCU), Korea Advanced Institute of Science and Technology (KAIST), 373-1, Guseong-dong, Yuseong-gu, Daejeon, 305-701, Republic of Korea

^bDepartment of Chemical & Biomolecular Engineering, Korea Advanced Institute of Science and Technology (KAIST), 373-1, Guseong-dong, Yuseong-gu, Daejeon, 305-701, Republic of Korea

Electronic supplementary information (ESI) available : Figure S1 ~ Figure S7, Table S1.

* Corresponding author.: Tel: +82-42-350-1719, Fax: +82-42-350-2248

E-mail address: jungpark@kaist.ac.kr (J.K. Park), jangwookchoi@kaist.ac.kr (J.W. Choi)

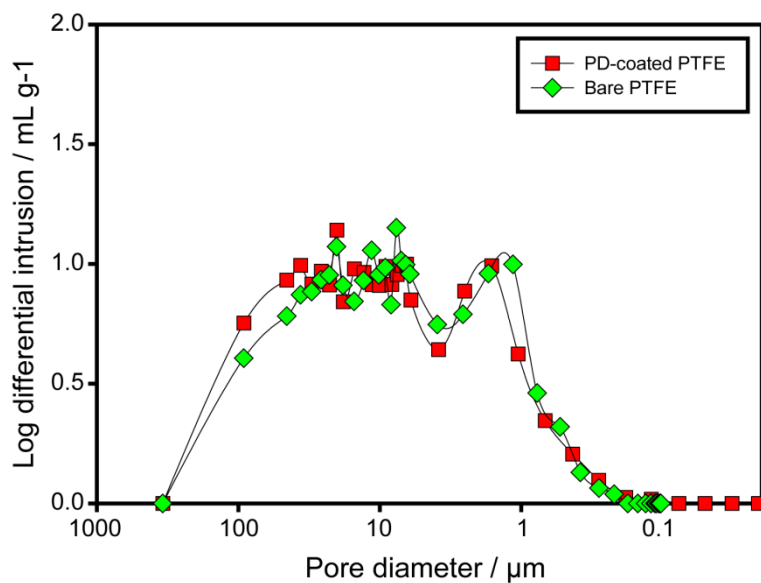


Figure S1. Pore size distributions of the bare PTFE and PD-coated PTFE substrates.

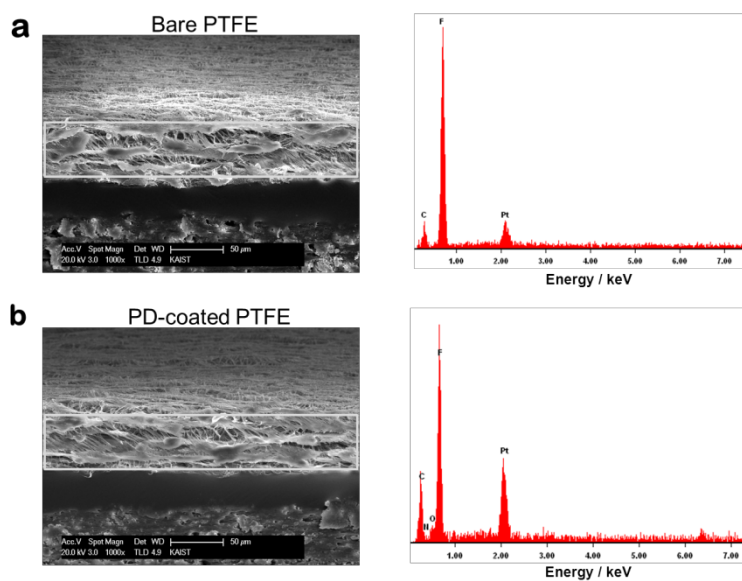


Figure S2. Cross-sectional SEM images (left) and corresponding EDX spectra (right) of (a) the bare PTFE substrate and (b) the PD-coated PTFE substrate.

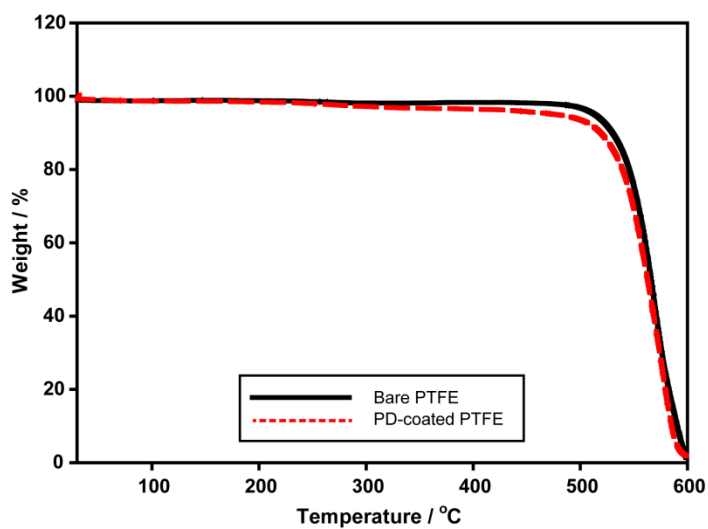


Figure S3. TGA curves of the bare and PD-coated PTFE substrates.

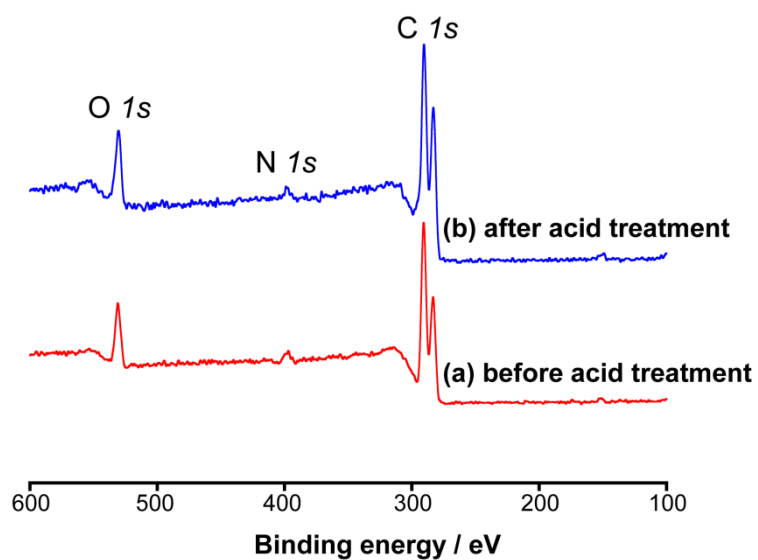


Figure S4. XPS data of the same PD-coated PTFE substrate (a) before and (b) after the dipping in 1 M sulfuric acid for 24 h.

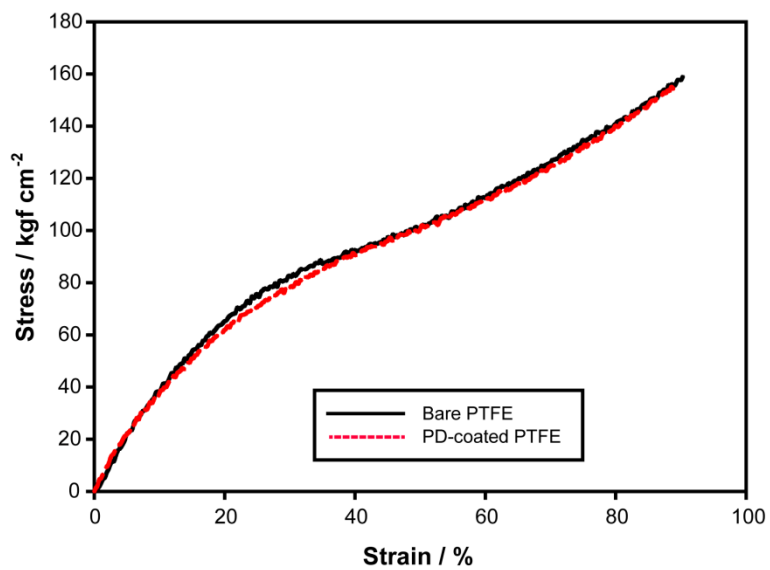


Figure S5. Stress-strain curves of the bare and PD-coated PTFE substrates.

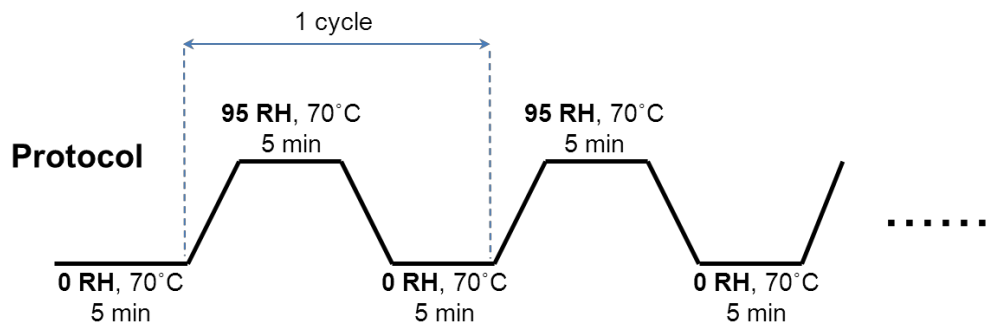


Figure S6. A wet/dry cycling protocol for long-term operations.

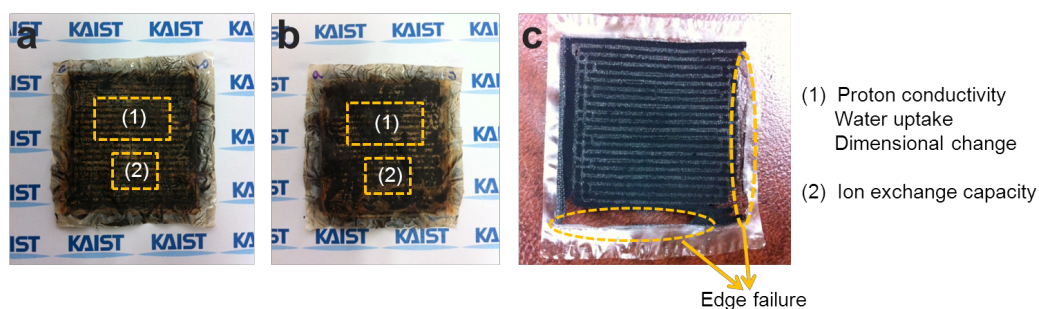


Figure S7. Optical images of the (a) bare PTFE and (b) PD-coated PTFE composite membranes after 920 wet/dry cycles. (c) An optical image of the sPEEK membrane after 60 wet/dry cycles under the same condition is also presented to show typical edge failure. In contrast to this image, those in (a) and (b) do not show similar failures along the edges.

Sample	Tensile strength (MPa)
Bare PTFE composite membrane	64.2
PD-coated composite membrane	63.7

Table S1. Tensile strengths of the bare and PD-coated composite membranes.