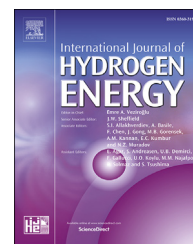


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## Short Communication

# Specific approaches to dramatic reduction in stack activation time and perfect long-term storage for high-performance air-breathing polymer electrolyte membrane fuel cell



Seung Yong Yang <sup>a,b,1</sup>, Dong-Jun Seo <sup>a,b,1</sup>, Myeong-Ri Kim <sup>a,b</sup>,  
 Won-Young Choi <sup>a,c</sup>, Young-Gi Yoon <sup>a</sup>, Min-Ho Seo <sup>a</sup>, Beom-Jun Kim <sup>a</sup>,  
 Chi-Young Jung <sup>a</sup>, Hansung Kim <sup>b,\*\*</sup>, Byungchan Han <sup>b,\*\*\*</sup>,  
 Tae-Young Kim <sup>a,\*</sup>

<sup>a</sup> Hydrogen and Fuel Cell Center, Korea Institute of Energy Research (KIER), Jellabuk-do 56332, Republic of Korea

<sup>b</sup> Department of Chemical and Biomolecular Engineering, Yonsei University, Seoul 03772, Republic of Korea

<sup>c</sup> Department of Energy Storage and Conversion Engineering, Chonbuk National University, Jellabuk-do 54596, Republic of Korea

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## ABSTRACT

Air-breathing polymer electrolyte membrane fuel cell (PEMFC) systems without the humidifier and air blower have been developed to overcome the cost and complexity of balance of plants (BOPs). Until now, there has been no specific way to improve the stack's initial performance through the specific activation protocol and maintain the initial performance for a very long time. Herein, we studied a technique for finishing the total activation within 1 h by using a pre-activation process (i.e., soaking the stack in a DI-water reservoir) and applying current at 0.65 V. The pre-activation procedure significantly increased the swelling of the polymer membrane and the Nafion binder in the catalyst layer, reducing the total activation time. Also, we showed that long-term storage using humidified N<sub>2</sub> gas in a closed box did not hinder the electrocatalytic activity of the Pt and the drying of the polymer membrane for 60 days.

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\* Corresponding author.

\*\* Corresponding author.

\*\*\* Corresponding author.

E-mail addresses: [elchem@yonsei.ac.kr](mailto:elchem@yonsei.ac.kr) (H. Kim), [bchan@yonsei.ac.kr](mailto:bchan@yonsei.ac.kr) (B. Han), [kty@kier.re.kr](mailto:kty@kier.re.kr) (T.-Y. Kim).

<sup>1</sup> These authors contributed equally to this work.

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