Solid oxide electrochemical cells are currently being developed for a variety of applications to solve environmental and energy related problems. The technology has been widely investigated and the improvement in the cell performance and performance stability has been recognized as one of the most important development needs for realizing higher efficiency and robust electrochemical devices for power generation, hydrogen production, oxygen separation, NOx decomposition, CO₂ electrolysis, syngas production and many other related applications. The significance of fabrication processes and characterization techniques for the development of cost effective and reliable solid oxide electrochemical cells is also increasing globally.

The special issue of the Journal sheds light on technologies that are enabling further improvement of the solid oxide electrochemical cells towards commercialization. The major topics in the special issue cover current development trend in the area of innovative ceramic materials, the state of the art—advanced ceramic fabrication processing, and characterization technologies for realizing high performance solid state electrochemical devices such as solid oxide fuel cells and solid oxide electrolysis cells.

The special issue brings compilation of high quality technical research papers, including topical review papers. The papers collected and published in this issue were reviewed according to the policies of the journal, and only those meeting the necessary quality requirements were accepted for publication.

We thank all the authors and reviewers for their efforts towards realizing this special issue. We sincerely hope that this special issue of the Journal of the Ceramics Society of Japan also provides much needed and important technical information on a variety of technologies related to solid oxide electrochemical cells that materials scientists, as well as researchers and engineers in manufacturing industries will find useful.

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Adjustment of GDC layer microstructure and its influence on the electrochemical properties of microtubular SOFCs
Karina Maria PACIEJEWSKA, Yi YU, Sascha KÜHN, Andreas WEBER and Matthias KLEBER
DOI http://dx.doi.org/10.2109/jcersj2.123.171

Effect of cell length on the performance of segmented-in-series solid oxide fuel cells fabricated using decalcomania method
Yong-Tae AN, Mi-Jung JI, Hae Jin HWANG, S. Eugene PARK and Byung-Hyun CHOI
DOI http://dx.doi.org/10.2109/jcersj2.123.178

Microtubular SOFC using doped LaGaO₃ electrolyte film prepared with dip coating method
Kohei HOSOI, Jong-Eun HONG, Takaaki SAKAI, Shintaro IDA and Tatsumi ISHIHARA
DOI http://dx.doi.org/10.2109/jcersj2.123.182

Material characterization and electrochemical performance of Sr(Ce₀.₆Zr₀.₄)₀.₈Y₀.₂O₃₋₈ proton conducting ceramics prepared by EDTA-citrate complexing and solid-state reaction methods
I-Ming HUNG, Yen-Juin CHIANG, Sheng-Wei LEE, Jeng-Kuei CHANG, Jing-Chie LIN, Jason Shian-Ching JANG, Chuan LI and Chi-Shiung HSI
DOI http://dx.doi.org/10.2109/jcersj2.123.187

Evolution of the sintering ability, microstructure, and cell performance of Ba₀.₈Sr₀.₂Ce₀.₈₋ₓ₋₉ₓ_ZrₓIn₉Y₀.₅O₃₋₈ (x = 0.05, 0.1 y = 0, 0.1) proton-conducting electrolytes for solid oxide fuel cell
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Performance regeneration in lanthanum strontium manganite cathode during exposure to H₂O and CO₂ containing ambient air atmospheres
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DOI http://dx.doi.org/10.2109/jcersj2.123.217

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Effects of lanthanum-to-calcium ratio on the thermal and crystalline properties of BaO–Al2O3–B2O3–SiO2 based glass sealants for solid oxide fuel cells
Chien-Kuo LIU, Kin-Fu LIN and Ruey-Yi LEE

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Fabrication and characterization of YSZ thin films for SOFC application
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Three electrode configuration measurements of electrolyte-diffusion barrier-cathode interface
Dagmara SZYMCZEWSKA, Jakub KARCZEWSKI, Aleksander CHRZAN and Piotr JASIŃSKI

DOI http://dx.doi.org/10.2109/jcersj2.123.268

◆ Technical report ◆

Sinterable powder fabrication of lanthanum silicate oxyapatite based on solid-state reaction method
Kiyoshi KOBAYASHI, Kenya HIRAI, Tohru S. SUZUKI, Tetsuo UCHIKOSHI, Takaya AKASHI and Yoshio SAKKA

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