

## Hydrogen Permeability of BSCY Proton-Conducting Perovskite Membrane

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**Abstract :** Perovskite-type membrane  $\text{Ba}_{0.5}\text{Sr}_{0.5}\text{Ce}_{0.9}\text{Y}_{0.1}\text{O}_{3-\delta}$  (BSCY) was successfully synthesized by liquid citrate method. The hydrogen permeation and stability of BSCY perovskite-type membranes were studied at high temperatures. The phase structure of the powder was characterized by X-ray diffraction (XRD). Scanning electron microscopy (SEM) was used to characterize microstructures of the membrane sintered under various conditions. SEM results showed that increasing in sintering temperature, formed dense membrane with clear grains. XRD results for BSCY membrane that sintered in  $1150^\circ\text{C}$  indicated single phase perovskite structure with orthorhombic configuration, and SEM results showed dense structure with clear grain size which is suitable for permeation tests. Partial substitution of Sr with Ba in SCY structure improved the hydrogen permeation flux through the membrane due to the larger ionic radius of  $\text{Ba}^{2+}$ . BSCY membrane shows high hydrogen permeation flux of  $1.6 \text{ ml/min.cm}^2$  at  $900^\circ\text{C}$  and partial pressure of 0.6.

**Keywords :** hydrogen separation, perovskite, proton conducting membrane.

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