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Multilayer ceramic deposition process of dense oxygen permeation membranes on porous supports

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ABSTRACT

A multilayer ceramic deposition process of $La_{0.6}Sr_{0.4}Ti_{0.3}Fe_{0.7}O_{3-\delta}$ (LSTF) was developed for the fabrication of durable oxygen-permeable membranes. By optimizing the diameter of the starting powder and sintering temperature, defects such as peeling and cracking in the ceramic multilayer could be eliminated. With this optimized process, we have fabricated a thin membrane LSTF formed by the slurry coating process on porous support LSTF and found its rate of oxygen permeation to be 18 $cm^3/min/cm^2$. With this multilayer ceramic LSTF membrane, we have demonstrated the generation of oxygenated water with oxygen concentrations three times greater than that in water placed in ordinary atmosphere (32 mg/l).

Keywords: Ceramic membrane; $LaSrTiFeO_3$ perovskite oxide; Oxygen permeation

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