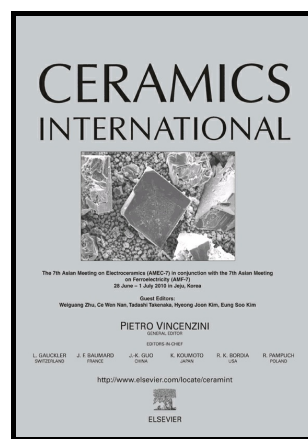


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Review of perovskite ceramic synthesis and membrane preparation methods

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Abstract

In the 25 years since the first report of mixed ionic and electronic conducting ceramics, perovskite membranes underwent both research and development phases, with the latest works entering pilot trials for oxygen separation from air. During this time a number of perovskite synthesis methods were investigated from the original solid state chemistry through the more advanced and well established sol-gel route via the Pechinni method. The advances in synthesis methods were possible due to the desirable full incorporation of cations into the A and B-sites of perovskites with a general ABO_3 structure. In terms of membrane manufacturing, perovskite hollow fibres attracted a major research effort due to small membrane thickness and high fluxes. This led to a number of investigations by doping with other cations or by surface modification, all aiming at increasing oxygen fluxes. Recently, advanced ceramic processing by tape casting has led to the preparation of very thin dense films either on porous supports or as monoliths containing internal porous regions. All these developments in perovskite synthesis and membrane preparation methods, together with other types of methods requiring special equipment are addressed in this review, including an

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