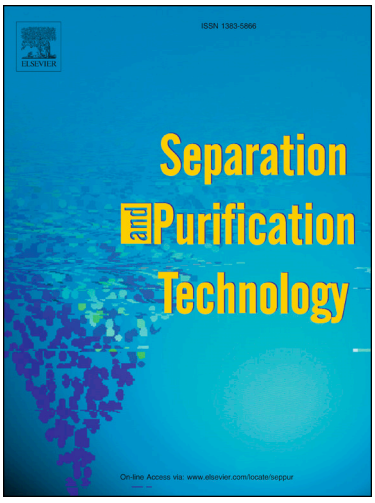


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PII: S1383-5866(17)31625-8
DOI: http://dx.doi.org/10.1016/j.seppur.2017.08.029
Reference: SEPPUR 13971

To appear in: *Separation and Purification Technology*

Received Date: 22 May 2017
Revised Date: 9 August 2017
Accepted Date: 10 August 2017

Please cite this article as: X. Zhang, J. Motuzas, S. Liu, J.C. Diniz da Costa, Zinc-doped BSCF perovskite membranes for oxygen separation, *Separation and Purification Technology* (2017), doi: http://dx.doi.org/10.1016/j.seppur.2017.08.029

# Zinc-doped BSCF perovskite membranes for oxygen separation

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**Abstract**

This work investigates the partial substitution of Zn in the B-site of perovskite as $Ba_{0.5}Sr_{0.5}(Co_{0.8}Fe_{0.2})_{1-x}Zn_xO_{3-\delta}$. The membranes were tested for oxygen separation from air and Zn incorporation into the BSCFZ cubic crystal structure proved to be effective as oxygen fluxes increased as compared with a pure BSCF (x=0, no Zn). This was attribute to the increase in oxygen vacancy concentration as a function of Zn concentration. As a result, oxygen fluxes for the BSCFZ membranes were 200% (700 °C) and 32% (900 °C) higher than the BSCF analogue membrane. However, the correlation between oxygen vacancy concentration and oxygen flux diverged for Zn concentrations x≥0.08, which was associated with the shift and broadening of the main XRD peak 2θ=31.81° of the BSCFZ cubic structure caused by an additional oxide phase (ZnO). Zn doping also affected the microstructure of the sintered BSCFZ membranes. Grain boundary dimensions reduced as Zn substitution in the B-site increased to x=0.06 up to 800 °C, resulting in improved oxygen fluxes. Contrary to this, high Zn concentration x≥0.08 increased grain boundary and reduced