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A novel dual phase composite oxygen membrane (Al$_{0.02}$Ga$_{0.02}$Zn$_{0.96}$O$_{1.02}$ - Gd$_{0.1}$Ce$_{0.9}$O$_{1.95-\delta}$) was successfully prepared and tested. The membrane shows chemical stability against CO$_2$ and SO$_2$, and a stable oxygen permeation over 300 hours in CO$_2$ was demonstrated. ZnO is cheap and non-toxic and is therefore highly advantageous compared to other common materials used for the purpose.

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