

Lanthanum-Barium Iron-Based Perovskite Oxides for Low Temperature Carbon Dioxide Conversion

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Conversion of CO₂ in a scalable technology has the potential for enormous energy and environmental impact but remains a challenge. Here I have presented several stable, earth abundant perovskite oxide materials for the reverse water gas shift chemical looping (RWGS-CL) process as a potential solution for this CO₂ mitigation problem. The effect of Ba doping on the conversion of CO₂ to CO was investigated on three differently concentrated LaBaFeO₃ perovskite oxides. The materials were synthesized and characterized through X-Ray diffraction and temperature programmed reduction and oxidation. The incorporation of the Ba facilitates the formation of oxygen vacancies while maintaining the stability of the perovskite. The La_{0.4}Ba_{0.6}FeO₃ proved to have the perfect balance of maintaining stability and yielding a high carbon monoxide level. The Lanthanum provides stability to the perovskite and the Barium allowed a higher yield of CO at a low temperature.