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Syngas production from methane dry reforming over $SmCoO_3$ perovskite catalyst: Kinetics and mechanistic studies

Osarieme Uyi Osazuwa [a,b], *Herma Dina Setiabudi* [a], *Sureena Abdullah* [a], *Chin Kui Cheng* [a,b,*]

[a] *Faculty of Chemical & Natural Resources Engineering, Universiti Malaysia Pahang, Lebuhraya Tun Razak, 26300 Gambang Kuantan, Pahang, Malaysia*

[b] *Centre of Excellence for Advanced Research in Fluid Flow (CARIFF), Universiti Malaysia Pahang, Lebuhraya Tun Razak, 26300 Gambang Kuantan, Pahang, Malaysia*

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ABSTRACT

The kinetics of the methane dry (CO_2) reforming over the $SmCoO_3$ was investigated in the temperature ranged 973–1073 K by varying the CH_4 and CO_2 partial pressures. Based on detailed study of the reaction mechanism, a mechanistic model is proposed from which a kinetic model is derived. The mechanistic pattern assumes adsorption of CH_4 on reduced Co, followed by methane cracking and carbon deposition. CO_2 reacts with Sm_2O_3 to form $Sm_2O_2CO_3$ and the oxycarbonates react with carbon to produce CO. The power law and Langmuir–Hinshelwood kinetic model which is established on this mechanism were able to forecast the kinetic results.

* *Corresponding author*. Faculty of Chemical & Natural Resources Engineering, Universiti Malaysia Pahang, Lebuhraya Tun Razak, 26300 Gambang Kuantan, Pahang, Malaysia. Fax: +60 9 5492889.
E-mail address: chinkui@ump.edu.my (C.K. Cheng).

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