Effects of lattice locations of the substituted metal to the Fibrous Perovskite for higher catalytic activity and stability

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The design of catalytic materials to build an efficient ultraclean system including direct conversion of heavy hydrocarbons into H2-rich gas fuels for the fuel cell system has been highlighted. The production of hydrogen from heavy hydrocarbons is dependent on the catalyst used and its activity and thermal stability. In this work, fibrous perovskite structures composed of a LaCrO3-based nanoparticle networks were prepared and different metal-substituted perovskites to the B-site with the formula LaCr1-x(Metal)xO3 have been investigated as catalysts for the production of H2-rich gas fuels. A fibrous morphology was observed for the substituted perovskites by SEM and TEM, and varying the amount of different metal incorporated into the perovskite lattice revealed a distortion of the original orthorhombic structure that indicated changes in the perovskite lattice and its reducibility. From characterizations, we found that the lattice and surface type of the substituted metal indicated different oxidation state of each species within the perovskite, which correlate to the activity, durability and coke formation on the catalysts.