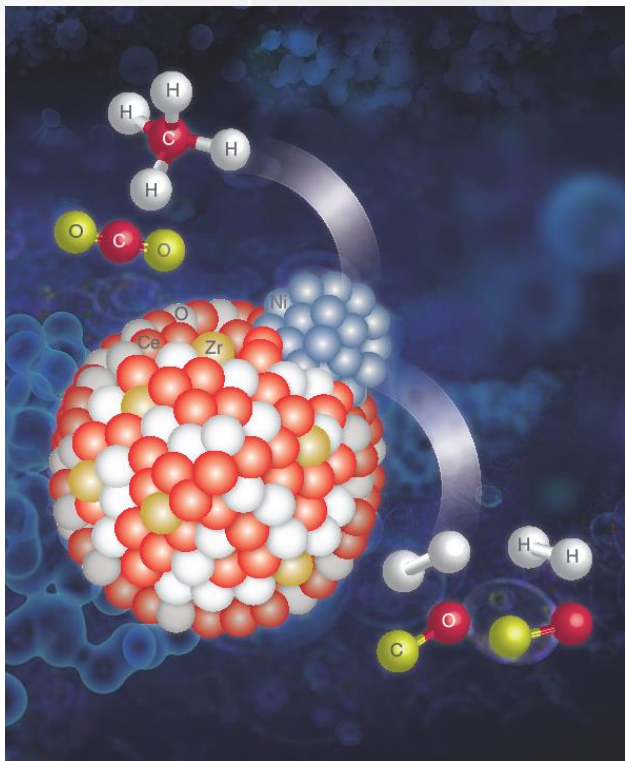


Improving a Natural Gas Conversion Catalyst



An artist's impression of the Zr-doped Ni-supported ceria (CeO_2) catalyst performing a DRM reaction.

F. Zhang, Z. Liu, X. Chen, N. Rui, L. E. Betancourt, L. Lin, W. Xu, C.-j. Sun, A. M. M. Abeykoon, J. A. Rodriguez, J. Teržan, K. Lorber, P. Djinić, S. D. Senanayake. *ACS Catalysis* **10** (5), 3274-3284 (2020).

Work was performed in part at Brookhaven National Laboratory

Scientific Achievement

Scientists revealed how zirconium (Zr) doping improved the catalytic performance on nickel (Ni) supported ceria (CeO_2) catalysts for hydrocarbon conversion.

Significance and Impact

Converting greenhouse gases such as CH_4 and CO_2 into useful intermediates or products offers green solutions for commercial fuel processing; this study revealed details about a mechanism to enhance catalytic performance.

Research Details

- The dry reforming of methane (DRM) reaction was studied using Zr doped nickel-ceria catalysts.
- In situ x-ray studies were performed at the PDF beamline at NSLS-II, beamlines 17BM and 21ID at the APS, using electron microscopy at the CFN.
- Incorporation of Zr into the ceria support led to significantly improved activity and H_2 selectivity.
- Zr prevented nickel migration to the surface and therefore preserved the active surface area.