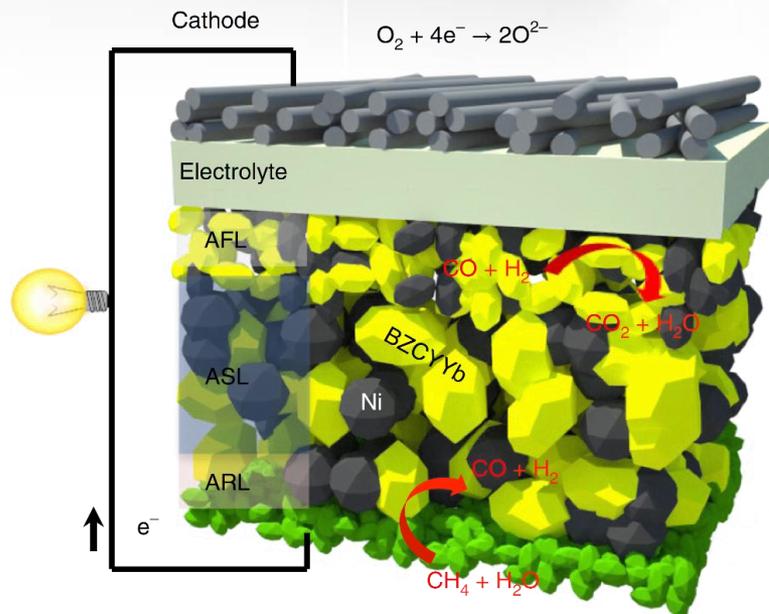


A New Robust Fuel Cell that Runs on Nearly Dry Methane



Structural design of a single cell from an intermediate-temperature fuel cell. The yellow and grey grains represent the different phases of the multifunctional anode.

Y. Chen, B. deGlee, Y. Tang, Z. Wang, B. Zhao, Y. Wei, L. Zhang, S. Yoo, K. Pei, J. H. Kim, Y. Ding, P. Hu, F. F. Tao, M. Liu. *Nature Energy* **3**, 1042–1050 (2018)

Scientific Achievement

Scientists designed a robust solid oxide fuel cell (SOFC) that operates on nearly dry methane at 500 °C enabled by synergistic thermal catalysis and electrocatalysis.

Significance and Impact

SOFCs have the potential to be remarkably flexible in terms of the fuels that they can utilize; but until now, direct use of methane at intermediate temperatures has been sluggish and inefficient.

Research Details

- SOFCs, consisting of nanofiber-based cathode and a multifunctional anode coated with a catalyst, were studied for reforming of CH₄ to H₂ and CO.
- Operando x-ray spectroscopy data from NSLS-II ISS beamline showed a synergistic effect of cationic Ni and Ru sites anchored on the catalyst surface, which play a role in the fuel cell's higher reliability and longer lifetime.

Work was performed in part at Brookhaven National Laboratory