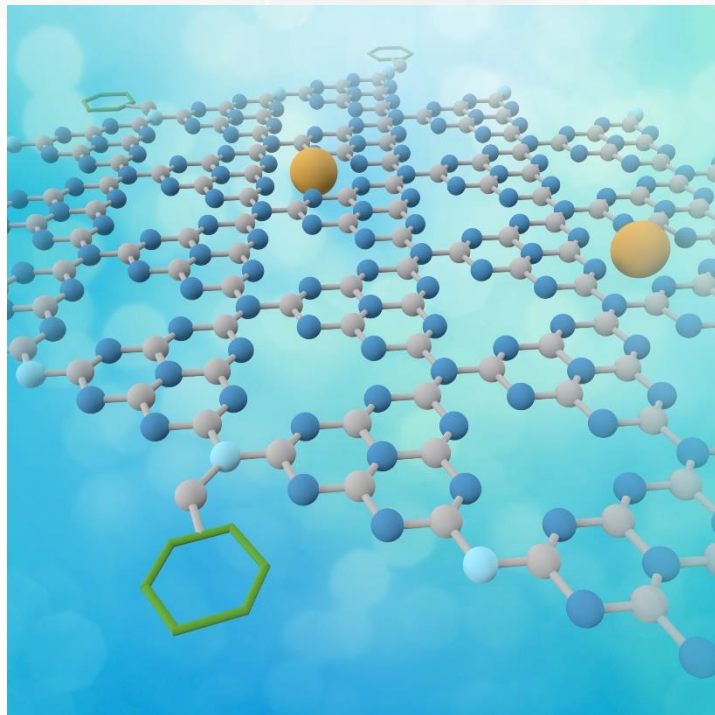


# Two Catalysts Are Better Than One



*The image shows a 2-D nanosheet with the two co-catalysts in their respective places: single-atom Co catalyst (yellow) sitting in the voids, and anthraquinone (green) attached to the edges of the sheet.*

C. Chu, Q. Zhu, Z. Pan, S. Gupta, D. Huang, Y. Du, S. Weon, Y. Wu, C. Muhich, E. Stavitski, K. Domen, J. Kim. *PNAS* **117** (12) 6376-6382 (2020).

Work was performed in part at Brookhaven National Laboratory

## Scientific Achievement

Scientists designed and demonstrated a new catalytic material made of two spatially separated co-catalysts on a nanosheet for hydrogen peroxide synthesis.

## Significance and Impact

Using hydrogen peroxide for water purification is more environmentally friendly than many alternatives, however the efficiency of the reaction is low; this new material provides a new pathway to higher efficiency and future application.

## Research Details

- Achieved spatial separation of the two co-catalysts so that no interaction during the reaction occurs.
- Discovered the underlying mechanism of the chemical reaction using this new catalytic material.
- Validated atomic structure and reaction mechanism through measurements at the ISS and TES beamlines at NSLS-II and compared findings to theoretical simulations.