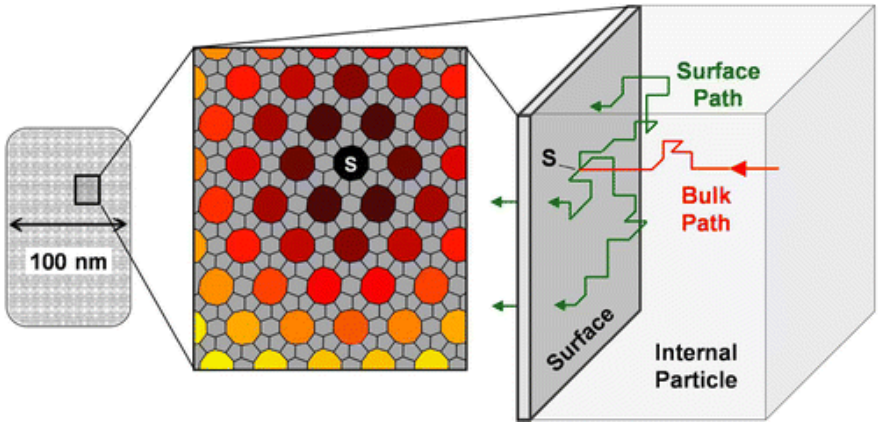
2D Surface Structures in Small Zeolite Catalyst Particles

Scientific Achievement

Revealed the zeolite surface structures using molecular simulation and experiment to show that molecular rates in nanoparticle porous materials are controlled by the surface.

Significance and Impact

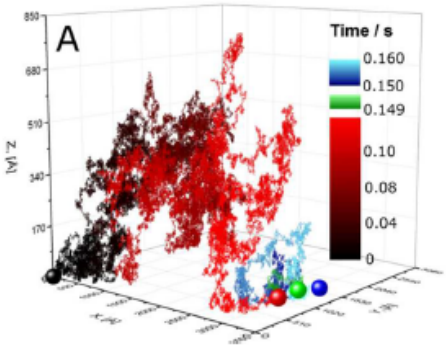
- **Understanding the surfaces of metalorganic frameworks (MOFs) and zeolites allow for design of surfaces for improved catalysis and separation.**



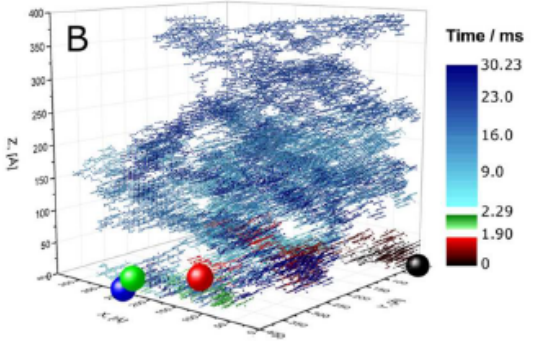
Research Details

- Molecules permeating the surface of porous materials are slowed as they must first locate open surface pores
- Molecules entering in small particles spend most of their time locating open surface pores
- Measured molecular transport rates indicate substantial surface defects

Large Particles (>800 nm)



Small Particles (10-400 nm)



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Work was performed at the University of Minnesota by the group of Dauenhauer