

Dr. David Robert Cole, Professor
School of Earth Sciences, The Ohio State University
125 South Oval Mall, Columbus OH 43210
Tel: (614) 688-7407; Fax: (614) 292-7688

Professional Preparation

State University of New York, Cortland, NY	Geology B.S. 1973
Pennsylvania State University, University Park, PA	Geology M.S. 1976
Pennsylvania State University, University Park, PA	Geochemistry/Mineralogy Ph.D. 1980

Appointments

2010-present	Professor, Ohio Research Scholar Endowed Chair, Subsurface Science and Sustainability, School of Earth Sciences, The Ohio State University
2024- present	Senator, University Senate
2021- 2024	Senator, College of Arts and Sciences Senate
2020-present	Faculty (P-status), Environmental Science Graduate Program
2010-present	Adjunct Professor, Dept. Chemistry and Biochemistry, OSU
2010-present	Director: SEMCAL-Subsurface Energy Materials Characterization and Analysis Laboratory, OSU
1996-2010	Head, Geochemistry and Interfacial Sciences Group, Chemistry Div., ORNL
2003-2010	Distinguished R&D Staff Scientist, ORNL
1992-2002	Senior Research Staff Scientist - Chemical and Analytical Sciences Division (now Chemical Sciences Division), ORNL
1982-1991	Research Staff Scientist - Chemistry Division, Oak Ridge National Laboratory, Oak Ridge, TN
1979-1982	Research Geochemist - Earth Science Laboratory (now Energy and Geosciences Inst.), Univer. Utah Research Institute, Salt Lake City UT

Professional Honors/Awards:

2024	Fellow, American Association for the Advancement of Science
2019	Fellow, Geological Society of America
2011	Burno M. Hanson Best Paper Award, Div. of Environmental Geosciences American Association of Petroleum Geologists
2009	Oak Ridge Nat. Lab Director's Award – Top ORNL Scientist of the Year Oak Ridge Nat. Lab: Group Leader of the Year Award
2006	Fellow, Mineralogical Society of America
2000	ORNL Technical Achievement Award: Exemplary effort leading to multiple, significant advancements in the field of isotope geochemistry, (with J. Horita, L. Riciputi)
1998	State University of New York Alumni Fellow (system-wide)
1999	Distinguished Alumni Award, State Univ. of New York, College at Cortland
1998	ORNL Research Accomplishment Award: Discovery, Description and Evolutionary Implications of Novel Subsurface Thermophilic Iron-Reducing Bacteria, (with T. Phelps)
1996	Dept. of Energy, Outstanding Contributions in Geosciences Research: Salt Effects on Stable Isotope Partitioning (with J. Horita, D. Wesolowski)
1987	Turner Distinguished Lecturer, University of Michigan, Geology Dept. Shell Distinguished Lecturer, Duke University, Geology Dept. ORNL Award of Publication Excellence: Stable Isotope Exchange Kinetics
1977-1979	National Science Foundation Graduate Fellow

Recent Publications:

Gautam, S., Vlcek, L., Mamontov, E., and Cole, D.R. (in press) Behavior of water and aqueous LiCl solutions confined in cylindrical silica pores: A wide temperature range molecular dynamics simulation study. (*Phys. Rev. E.*)

Gautam, S. and Cole, D.R. (2025) Adsorption of Hydrogen, Methane, CO₂ and their Binary Mixtures in a Sub-Nanopore Matrix: Role of Pore Characteristics Revealed by Molecular Simulations. *Royal Soc. Chem. – Advances*, doi: 10.1039/d5ra0652h **15**, 47081-47091 doi: 10.1039/d5ra0652h

Gautam, S. and Cole, D. (2025) Diffusion of C-O-H Fluids in a Sub-Nanometer Pore Network: Role of Pore Surface Area and Its Ratio with Pore Volume. *C - J Carbon Res.* **2025**, 11, 57. doi.org/10.3390/c11030057

Khandoozi, S., Li, P., Ershadnia, Dai, Z., Zhang, Z., Huerta, N., Stauffer., P.H., Mehana, M., Cole, D. R. and Soltanian, M. R. (2025) An integrated approach for optimizing geological hydrogen storage. *Applied Energy* 381, 125182.

Ok, S., Sheets, J., Welch, S, and Cole, D. R. (2025) Natural clay-methane interfacial interactions revealed by high-pressure Magic Angle Spinning (MAS) NMR. *Fuels* 6(1), 16 <https://doi.org/10.3390/fuels6010016>

Dhiman, I, Cole, D. R. and Gautam, S. (2025) Selective adsorption, structure, and dynamics of CO₂-CH₄ mixtures in Mg-MOF-74 and the influence of intracrystalline disorder. *Chemical Physics*, 112661 <https://doi.org/10.1016/j.chemphys.2025.112661>

Kummali, M. M., Cole, D. R. and Gautam, S. (2024) Mixtures of ethane with CO₂ and water simulated in ZSM-22: The role of polarity and hydrogen bonding. *Physica Scripta* 99, 125960 doi 10.1088/1402-4896/ad8f73

Gautam, S., Cole, D. R., Dudas, Z. I. and Dhiman, I. (2024) Simulation of hydrogen adsorption in hierarchical silicalite: Role of electrostatics and surface chemistry. *ChemPhyChem*. doi.org/10.1002/cphc.202400360

Labotka, T. C., Cole, D. R. and DeAngelis, M. T. (2024) An experimental study of the breakdown of dolomite in H₂O at 700°C, 100MPa. *Am. Min.* doi.org/10.2138/am-2024-9368

Khandoozi, S., Ershadnia, R., Han, W.S., Kim, K-Y., Dai, Z., Mehana, M., Cole, D. R. and Solanina, R. (2024) Enhancing predictive accuracy and understanding in geological carbon dioxide storage monitoring: Simulation and history matching of tracer transport dynamics *Chem. Eng. J.* doi.org/10.1016/j.cej.2024.153127

Kummali, M. M., Cole, D. R. and Gautam, S. (2024) Dynamics of ethane, CO₂, water, and binary mixtures of ethane with CO₂ and water in ZSM-22. *Amer. Inst. Phys.* 2995, 020126 <https://doi.org/10.1063/5.0178139>

Ali, A., Cole, D. R. and Striolo, A. (2024) Cushion gas effects on clay-hydrogen-brine wettability at conditions relevant to underground gas storage. *Internat. J. Hydrogen Energy* 58, 668-677. <https://doi.org/10.1016/j.ijhydene.2024.01.151>

Gautam, S. and Cole, D. R. (2023) Ethane-CO₂ mixture adsorption in silicalite: Influence of tortuosity and connectivity of pores on selectivity. *C-Journal for Carbon Research* <https://doi.org/10.3390/c9040116>

Ali, A., Cole, D. R. and Striolo, A. (2023) Understanding the aggregation of island and archipelago asphaltene molecules near kaolinite surfaces using molecular dynamics. *Energy & Fuels* doi.org/10.1021/acs.energyfuels.3c00504

Xu, Z., Cao, H., Yoon, S., Kang, P. K., Jun, Y-S., Kneafsey, T., Sheets, J., Cole., D. and Pyrak-Nolte, L. (2023) Gravity-driven controls on fluid and calcite precipitation distributions in fractures. *Sci. Reports* <https://doi.org/10.1038/s41598-023-36406-8>

Dhiman, I., Berg, M. C., Cole, D. R. and Gautam, S. (2023) Correlation between structure and dynamics of CO₂ confined in Mg-MOF-74 and the role of inter-crystalline space: A molecular dynamics simulation study. *Applied Surface Chemistry.* 612, 155909 doi.org/10.1016/j.apsusc.2022.155909

McGunningle, J., Cano, E., Sharp, Z., Muehlenbachs, K., Cole, D. R., et al. (2022) Triple oxygen isotope evidence for a hot Archean Ocean. *Geology* 50 (9), 991-995 doi.org/10.1130/G50230.1