

**Dr. Jeremy E. P. Dahl**  
**Senior Project Geochemist**

Dr. Dahl received his B. A. (Geology, 1979) from the College of Wooster, his M.A. from Rice University (Geology, 1981), and his Ph.D. (Geology, 1990) from UCLA. A Fulbright Scholar and a member of Phi Beta Kappa, Jeremy's Masters work was on the Greenhouse Effect and his Ph.D. work was on the effects of natural irradiation on the organic matter of the Alum Shale, Sweden. Dr. Dahl developed a variety of geochemical techniques both during his 8 years with Chevron Research and during many years at Stanford University. Jeremy co-founded OilTracers LLC in 1999. In 2010, OilTracers was acquired by Weatherford Laboratories. Techniques developed by Dr. Dahl include the indirect determination of source-rock quality from generated oils and the estimation of oil-to-gas conversion factors from diamondoid concentrations in oils and gas condensates. A senior or co-author of more than 100 publications and 27 United States Granted Patents, he has also written proprietary geochemical studies on most of the major petroleum basins of the world during his tenure at Chevron and subsequently as a consultant. His current research interests include reservoir geochemistry, petroleum biodegradation and diamondoids.

**EDUCATION**

*Ph.D. U.C.L.A.*, 1990, Geology, one year as Fulbright Scholar to Sweden, Dissertation: The organic geochemistry of the Alum Shale, Sweden.

*M.A. Rice University*, 1981 Geology, Welsch Foundation Fellow; Thesis: A study of the carbon cycle (dealt with sources and sinks of atmospheric CO<sub>2</sub>).

*B.A. College of Wooster*, 1979 Geology, Phi Beta Kappa, Senior thesis: Trace element analysis of ancient Cypriot Copper slags; Evidence for bacterial leaching.

**INDUSTRY EXPERIENCE**

*Weatherford Laboratories*, Berkley, California:

**Senior Project Geochemist.** Integration of OilTracers LLC business into Weatherford Laboratories (2010-present). OilTracers LLC was acquired by Weatherford Laboratories on March 3, 2010.

*OilTracers, L.L.C.*, Dallas, Texas:

**Co-founder and Senior Project Geochemist.** Technical service to substantially reduce oil and gas exploration risk, and optimize field development (1999-2010).

*Stanford University, Dept. of Earth and Environmental Science*, Stanford, California:

**Research Associate** (1997-present).

*Chevron Oil Field Research Company*, Richmond, California:

**Research Geochemist.** Work involved developing methods to fingerprint and characterize oils and rock extracts using various forms of chromatography and quantitative GCMS analysis (1989-97).

*Karolinska Inst. School of Medicine, Dept. of Biochemistry*, Stockholm, Sweden:

Worked on isolation of estrogen receptors for protein sequencing (1981-83).

*Rice University, Teaching Assistant*, Introductory Geology, Historical Geology (1980-81).

*Univ. Calif. Los Angeles, Teaching Assistant*, Oceanography, General Geology (1984-89).

## GRANTED US PATENTS

7402835 Heteroatom-containing diamondoid transistors  
7402716 Hybrid cubic/hexagonal diamondoids  
7312562 Heterodiamondoid-containing field emission devices  
7309476 Diamondoid-based components in nanoscale construction  
7306674 Nucleation of diamond films using higher diamondoids  
7306671 Diamondoid-containing low dielectric constant materials  
7304190 Photoresist compositions comprising diamondoid derivatives  
7276222 Diamondoid-containing thermally conductive materials  
7273598 Diamondoid-containing materials for passivating layers in integrated circuit devices  
7224532 Optical uses diamondoid-containing materials  
7173160 Processes for concentrating higher diamondoids  
7160529 Diamondoid-containing field emission devices  
7094937 Compositions comprising cyclohexamantane  
7061073 Diamondoid-containing capacitors  
7049374 Heterodiamondoids  
7034194 Compositions comprising decamantanes and processes for their separation  
6861569 Processes for the purification of higher diamondoids and compositions comprising such diamondoids  
6858700 Polymerizable higher diamondoid derivatives  
6844477 Processes for the purification of higher diamondoids and compositions comprising such diamondoids  
6843851 Compositions comprising pentamantanes and processes for their separation  
6831202 Compositions comprising octamantanes and processes for their separation  
6828469 Compositions comprising heptamantane and processes for their separation  
6815569 Compositions comprising tetramantanes and processes for their separation  
6812371 Compositions comprising nonamantanes and processes for their separation  
6812370 Compositions comprising hexamantanes and processes for their separation  
6783589 Diamondoid-containing materials in microelectronics  
6743290 Compositions comprising undecamantanes and processes for their separation

## PUBLICATIONS

Richter R., Rohr M.I.S., Zimmermann T., Petersen J., Heidrich C., Rahner R., Moller T., Dahl J.E., Carlson R.M.K., Mitric R., Rander T. and Merli A. (2015) Laser-induced fluorescence of free diamond molecules. *Phys. Chem. Chem. Phys.* **17**, 4739.

Clay W.A., Dahl J.E.P., Carlson R.M.K., Melosh N.A. and Shen Z.X. (2015) Physical properties of materials derived from diamondoid molecules. *Reports on Progress in Physics.* 78(1): 016501.

Balaban, A.T., Young, D.C., Plavec J., Pompe M., Schreiner P.R., Fokin A.A., Dahl J.E. and Carlson R.M.K. (2015) NMR spectral properties of the tetramantanes- Nanometer-sized diamond molecules. *Magnetic Resonance in Chemistry* (published online 10.1002/mrc.4289).

Zhou Y., Dahl J., Carlson B. and Liang H. (2015) Effects of molecular structures of carbon-based molecules on bio-lubrication. *Carbon* **86**, 132-138.

Moldowan J.M., Dahl J.E., Zinniker D. and Barbanti S. (2015) Underutilized advanced geochemical technologies for oil and gas exploration and production-1. The diamondoids. *Journal of Petroleum Science and Engineering*, 126, 87-96.

Fan Y. Lin Y, Dahl J.E.P, Carlson R.M.K, and Mao W.L. (2014) Deviatoric Stress-Induced Phase Transitions in Diamantane. *J. Chem Phys.* **141**, 154305.

Allan A.M., Vanorio T. and Dahl J.E.P. (2014) Pyrolysis-induced P-wave velocity anisotropy in organic-rich shales. *Geophysics* 79, pp. D41-D53.

Randel J.C., Niestemski F.C., Botello-Mendez A.R., Mar W. Ndabashimiye G., Melinte S., Dahl J.E.P., Carlson R.M.K., Butova E.D., Fokin A.A., Schreiner P.R., Charlier J.C and Monoharan H.C. (2014) Unconventional molecule-

resolved current rectification in diamond-fullerene hybrids. *Nature Comm.* 5, 4877 doi: 10.1038/ncomms5877.

Hohman J.N., Yan H. Solis-Ibarra D., Narasimha T. K., Li F.H., Kong Y., Wu B., Middleton J. K., Swboda r., Vailionis A., Dahl J.E.P., Carlson R.M.K., Shen Z.X. and Melosh M. (submitted to *Nature Materials*) Metal-Organic Chalcogenides and Supramolecular Control of Metal Chalcogenide Bonding and Band Structure.

Fokina A.A, Yurchenko R.I., Tkachenko B.A., Fokina N. A., Gunawan M.A., Poinso D., Dahl J.E.P, Carlson R.M.K, Serafin M., Catey H., Hierso J.C. and Schreiner P.R. (2014) Selective Preparation of Diamondoid Phosphonates. *J. Org. Chem.* **79-11**, 5369-5372.

Yang F., Lin Y., Dahl J., Carlson R., Mao W. (2014) High Pressure Raman and X-ray Diffraction Study of [121] Tetramantane. *Journal of Phys. Chem C.* **118**, 7683-7689.

Richter R., Wolter D., Zimmermann T., Landt L., Knecht A., Heidrich C., Merli A., Dopfner O., Reiss P., Ehresmann A., Petersen J., Dahl J.E., Carlson R.M.K., Bostedt C., Moeller T., Mitric R., and Rander T. (2014). Size and shape dependent photoluminescence and excited state decay rates of diamondoids. *Phys. Chem. Chem. Phys.* 16, 3070-3076.

Kahl P., Tkachenko B.A., Novikovskiy A.A., Becker J., Dahl J.E.P., Carlson R.M.K., Fokin A.A. and Schreiner P.R. (2014). Efficient preparation of apically substituted diamondoid derivatives. *Synthesis* 46, 0787-0798.

Pechenezhskiy I.V., Hong X., Nguyen G.D., Carlson R.M.K., Dahl J.E.P., Wang F., and Crommie M.F. (2013). Infrared spectroscopy of molecular submonolayers on surfaces by infrared scanning tunneling microscopy: Tetramantane on Au(111). *Phys. Rev. Lett.* 111, 126101(1-5).

Li F.H., Fabbri J.D., Yurchenko R.I., Mileshkin A.N., Hohman J.N., Yan H., Yuan H., Tran I.C., Willey T.M., Bagge-Hansen M., Dahl J.E.P., Carlson R.M.K., Fokina A.A., Schreiner P.R., Shen Z.X. and Melosh N.A. (2013) Covalent attachment of diamondoid phosphonic acid dichlorides to tungsten oxide surfaces. *Langmuir* **29**, 9790-9797.

Zhang J., Zhu Z., Feng Y., Ishiwata H., Miyata Y., Kitaura R., Dahl J.E.P., Carlson R.M.K., Fokina N.A., Schreiner P.R., Tomanek D and Shinohara H. (2013). Evidence of diamondoid nanowires from diamantane carboxylic acid. *Angewandte Chemie* **125**, 3805-3809.

Rander T., Staiger M., Richter R., Zimmerman T., Landt L., Wolter D., Dahl J.E., Carlson R.M.K., Tkachenko B.A., Fokina N.A., Schreiner P.R., Moller T., and Bostedt C. (2012) Electronic structure tuning of diamondoids through functionalization. *Journal of Chemical Physics* **138**, 024310-1 to -7.

Zhang J., Feng Y., Ishiwata H., Miyata Y., Kitaura R., Dahl J.E.P., Carlson R.M.K., Shinohara H. and Tomanek D. (2012) Synthesis and transformation of linear adamantane assemblies inside carbon nanotubes. *ACS Nano* **6** (10), 8674-83.

Dahl, J., Moldowan, J.M., Walls, J., Nur, A., DeVito, J., 2012. Creation of porosity in tight shales during organic matter maturation. *Search and Discovery*. Article #40979.

Bostedt, C., Landt L., Moller T., Dahl J.E. and Carlson R.M.K (2012) Diamondoids. *In Nature's Nanostructures*. Barnard A.S. and Guo H. (eds.) Pan Stanford Publ. Ltd., pp. 169-195.

Ishiwata H., Acremann Y., Scholl A., Hellwig O., Dobisz E., Doran A., Tkachenko B.A., Fokina A.A., Schreiner P.R., Dahl J.E.P., Carlson R.M.K., Melosh N., Shen Z.X. and Ohldag H. (2012) Diamondoid coating enables disruptive approach for chemical and magnetic imaging with 10nm spatial resolution. *Applied Phys. Letters* **101**, 163105-11.

Fokina N.A., Tkachenko B.A., Dahl J.E.P., Carlson R.M.K., Fokin A.A. and Schreiner P.R. (2012) Synthesis of diamondoid carboxylic acids. *Synthesis* **2012** #2, 259-264.

Fokina A., Churnish L., Gunchenko P., Tikhonchuk E., Hausman H., Serafin M., Dahl J., Carlson R., and Schreiner P. (2012) Stable alkanes containing very long carbon-carbon bonds. *Journ. Amer. Chem. Soc.* **134**(33), 13641-50.

Clay W.A., Maldonado J.R., Pianetta P., Dahl J.E., Carlson R.M.K., Schreiner P.R., Fokin A.A., Tkachenko B.A., Melosh N. and Shen Z.X. (2012) Photocathode device using diamondoid and cesium bromide films. *Applied Phys.*

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Fokina N.A., Tkachenko B.A., Dahl J.E.P., Carlson J.M.K., Fokin A.A. and Schreiner P.R. (2012) Synthesis of diamondoid carboxylic acids. *Synthesis* **44**, 259-264.

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Dahl J.E.P., Moldowan J.M., Wei Z. Lipton P.A., Denisevich P., Gatt R., Liu S., Schreiner P.R. and Carlson R.M.K. (2010) Synthesis of higher diamondoids and implications for their formation in petroleum. *Angew. Chem. Int. Ed.* **49**, 9881-9885.

Roth S., Leuenberger D., Osterwalder J., Dahl J.E., Carlson R.M.K., Tkachenko B.A., Fokin A.A., Schreiner P.R. and Hengsberger M. (2010) Negative-electron-affinity diamondoid monolayers as high-brilliance source for ultrashort electron pulses. *Chem. Phys. Lett.* **495**, 102-108.

Lasse Landt, Christoph Bostedt, Thomas Möller, Roland Mitric, Jeremy E. P. Dahl, Robert M. K. Carlson, Boryslav A. Tkachenko, Andrey A. Fokin, Peter R. Schreiner, Alexander Kulesza, and Vlasta Bonacic-Koutecky (2010) Experimental and Theoretical Studies of the Absorption Properties of Thiolated Diamondoids. *J. Chem. Phys.* **132**, 144305

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McCaffrey M.A., Baskin D.K., Patterson B.A., Dahl J.E. and Weissenberger K.S. (2010) Geochemical allocation of commingled oil production and/or commingled gas production from 2-6 pay zones. *AAPG Search and Discovery Article #901110*.

Cates N.C., Gysel R., Dahl J.E.P., Sellinger A. and McGehee (2010) Effects of intercalation on the hole mobility of amorphous semiconductor polymer blends. *Chem. Mater.* **22** (10), 3543-3548.

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Schreiner P.R., Fokin A.A., Reisenauer H.P., Tkachenko B.A., Vass E, Olmstead M.M., Bläser D., Boese R., Dahl J.E.P. and Carlson R.M.K. (2009). [123]Tetramantane: Parent of a New Family of  $\sigma$ -Helicenes. *Journ. Am. Chem. Soc.* **131**, 11292–11293

Landt L., Kielich W., Wolter D., Staiger M., Ehresmann A., Möller T. and Bostedt C. (2009) Intrinsic

photoluminescence of adamantane in the ultraviolet spectral region. *Phys. Rev B* **80**, 205323-1 to 205323-4

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Fokin A.A., Merz A., Fokina N.A., Schwertfeger H., Liu S.L., Dahl J.E.P., Carlson R.M.K., Schreiner P.R. (2009) Synthetic routes to aminotriamantanes, topological analogues of the neuroprotector memantine. *Journ. of Synth. Org. Chem.* **6**, 909-912.

Clay W.A., Sasagawa T., Kelly M., Dahl J.E., Carlson R.M.K., Melosh N. and Shen Z.X. (2008) Diamondoids as low-K dielectric material. *Appl. Physics Lett.* **93**, art.#172901.

Wiley T.M., Fabbri J.D., Lee J.R.I., Schreiner P.R., Fokin A.A., Tkachenko B. A., Fokina N. A., Dahl J.E.P., Carlson R.M.K., Vance A.L., Yang W., Terminello L.J., van Buuren T. and Melosh N.A. (2008) Near-Edge X-Ray Absorption Fine Structure Spectroscopy of Diamondoid Thiol Monolayers on Gold. *J. Am. Chem. Soc.* **130** (32), 10536-10544.

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Davis M.C., Dahl J.E.P. and Carlson R.M.K. (2008) Preparations of Diisocyanates of Adamantane and Diamantane. *Synthetic Communications* **38**, 1153-1158.

Wang Y., Kioupakis E., Lu X., Wegner D., Yamachika R., Dahl J.E., Carlson R.M.K., Louie S. G., Crommie M.F. (2008) Spatially resolved electronic and vibronic properties of single diamondoid molecules. *Nature Materials* **7**, 38-42.

Wei Z., Moldowan J.M., Fago F., Dahl J.E., Cai C. and Peter K.E. (2007) Origins of thiadamantoids and diamondoidthiols in petroleum. *Energy and Fuels* **21** (6), 3431-3436.

Yang W. L., Fabbri J. D., Wiley T. M., Lee J. R. I., Dahl J. E., Carlson R. M. K., Schreiner P. R., Fokin A. A., Tkachenko B. A., Fokina N. A., Meevasana W., Mannella N., Tanaka K., Zhou X. J., van Buuren T., Kelly M. A., Hussain Z., Melosh N. A., Shen Z.-X. (2007) Monochromatic Electron Photoemission from Diamondoid Monolayers, *Science*, v. 316, p. 1460 – 1462.

Pirali O., Verlvoet M, Dahl J.E., Carlson R.M.K., Tielens A.G.G.M. and Oomens J. (2007) Infrared spectroscopy of diamondoid molecules: New insights into the presence of nanodiamonds in the interstellar medium. *The Astrophysical Journal* **661**, 919-925.

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Filik J., Harvey J.N., Allan N.L., May P.W., Dahl J.E.P., Liu S. and Carlson R.M.K. (2006) Raman spectroscopy of nanocrystalline diamond: An ab initio approach. *Phys. Rev. B* 74, 035423-1-035423-10.

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