



J. Moldowan

Professor (Research) of Geological and Environmental Sciences, Emeritus
Earth & Planetary Sciences

Bio

ACADEMIC APPOINTMENTS

- Emeritus Faculty, Acad Council, Earth & Planetary Sciences

ADMINISTRATIVE APPOINTMENTS

- Post Doctoral Fellow, Department of Chemistry, Stanford University, (1972-1972)
- Post Doctoral Associate, The University of Michigan, (1972-1974)
- Research Chemist, Chevron Oil Field Research Company, Richmond, California, (1974-1980)
- Senior Research Chemist, Chevron Old Field Research Co., (1980-1985)
- Senior Research Associate, Chevron Oil Field Research Co., (1985-1986)
- Group Leader, Biomarker Group, Chevron Oil Field Research Co., (1986-1991)
- Section Supervisor, Biomarker Group, Chevron Oil Field Research Co., (1991-1993)
- Professor (Research), Department of Geological & Environmental Sciences, Stanford University, (1993- present)

HONORS AND AWARDS

- Undergrad Research Award, National Science Foundation (1968)
- Postdoctoral Fellowship, National Institutes of Health (1972)
- Best Paper Published in Organic Chemistry, Organic Geochemistry Division, Geological Society of America (1979)
- Best Paper Published in Organic Chemistry, Organic Geochemistry Division, Geological Society of America (1990)
- Recognition Award, Chevron Oil Field Research Co. (1990)
- Recognition Award, Chevron Oil Field Research Co. (1991)
- Co-author of top award winning student paper, AAPG National Meeting (1997)
- Geochemical Fellow, The Geochemical Society & the European Association of Geochemistry (2011)
- Recipient of the Alfred Treibs Medal for career accomplishments in organic geochemistry, Organic Geochemistry Division of the Geochemical Society (2011)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Invited speaker, AAPG National Meeting, Denver, CO, June 1-3. (2015 - 2015)

PROFESSIONAL EDUCATION

- Ph.D., The University of Michigan , Chemistry (1972)
- B.S., Wayne State University , Chemistry (1968)

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Research

The history of life on Earth can be studied in the fossil record and in the chemical fossil record. In our research we study molecular fossils, biomarkers that can provide evolutionary and paleoenvironmental information from the organic component of sediments and petroleum. Current research foci include correlating fossil and molecular fossil records, understanding paleoenvironments and global change, determining the degree of thermal evolution of organic matter, and understanding petroleum biodegradation mechanisms. Our interests also lie in applications of organic geochemistry to understanding sedimentary basins, petroleum systems and reservoir architecture, and to environmental problems related to petroleum.

Teaching

I teach courses related to the subject matter of my research. The technology and its application in aspects of petroleum exploration and production, environmental analysis. Petroleum Geochemistry in Environmental and Earth Science. For those students interested in applying molecular geochemistry in their thesis research I teach a follow-up course called Laboratory Methods in Organic Geochemistry. Courses are taught in our facilities in Rohnert Park, CA, or on-site as appropriate.

Professional Activities

I am currently CEO and President of Biomarker Technologies, Inc., a research and services laboratory dedicated to application of advanced geochemical technologies for petroleum exploration, development and production and for environmental and remediation monitoring.

Publications

PUBLICATIONS

- **Underutilized advanced geochemical technologies for oil and gas exploration and production-1. The diamondoids** *JOURNAL OF PETROLEUM SCIENCE AND ENGINEERING*
Moldowan, J. M., Dahl, J., Zinniker, D., Barbanti, S. M.
2015; 126: 87-96
- **Stereochemistry, elution order and molecular modeling of four diasteranes in petroleum** *ORGANIC GEOCHEMISTRY*
Peters, K. E., Moldowan, J. M., LaCroce, M. V., Kubicki, J. D.
2014; 76: 1-8
- **Cracking, mixing, and geochemical correlation of crude oils, North Slope, Alaska** *AAPG BULLETIN*
Wang, Y., Peters, K. E., Moldowan, J. M., Bird, K. J., Magoon, L. B.
2014; 98 (6): 1235-1267
- **The Western Desert versus Nile Delta: A comparative molecular biomarker study** *MARINE AND PETROLEUM GEOLOGY*
El Diasty, W. S., Moldowan, J. M.
2013; 46: 319-334
- **Diamondoids as Indicators of Thermal Evolution and Natural Cracking of Oils From the Western Desert and the Nile Delta** *Egypt PETROLEUM SCIENCE AND TECHNOLOGY*
El Diasty, W. S., Moldowan, J. M.
2013; 31 (7): 702-711
- **Application of biological markers in the recognition of the geochemical characteristics of some crude oils from Abu Gharadig Basin, north Western Desert-Egypt** *MARINE AND PETROLEUM GEOLOGY*
El Diasty, W. S., Moldowan, J. M.
2012; 35 (1): 28-40

- **Oil families and their inferred source rocks in the Barents Sea and northern Timan-Pechora Basin, Russia** *AAPG BULLETIN*
He, M., Moldowan, J. M., Nemchenko-Rovenskaya, A., Peters, K. E.
2012; 96 (6): 1121-1146
- **The sulfur-isotopic compositions of benzothiophenes and dibenzothiophenes as a proxy for thermochemical sulfate reduction** *GEOCHIMICA ET COSMOCHIMICA ACTA*
Amrani, A., Deev, A., Sessions, A. L., Tang, Y., Adkins, J. F., Hill, R. J., Moldowan, J. M., Wei, Z.
2012; 84: 152-164
- **Thiadiamondoids as proxies for the extent of thermochemical sulfate reduction** *ORGANIC GEOCHEMISTRY*
Wei, Z., Walters, C. C., Moldowan, J. M., Mankiewicz, P. J., Pottorf, R. J., Xiao, Y., Maze, W., Nguyen, P. T., Madincea, M. E., Phan, N. T., Peters, K. E.
2012; 44: 53-70
- **New triaromatic steroids distinguish Paleozoic from Mesozoic oil** *ORGANIC GEOCHEMISTRY*
Barbanti, S. M., Moldowan, J. M., Watt, D. S., Kolaczowska, E.
2011; 42 (4): 409-424
- **Synthesis of Higher Diamondoids and Implications for Their Formation in Petroleum** *ANGEWANDTE CHEMIE-INTERNATIONAL EDITION*
Dahl, J. E., Moldowan, J. M., Wei, Z., Lipton, P. A., Denisevich, P., Gat, R., Liu, S., Schreiner, P. R., Carlson, R. M.
2010; 49 (51): 9881-9885
- **Occurrence and biomarker potential of 23-methyl steroids in diatoms and sediments** *ORGANIC GEOCHEMISTRY*
Rampen, S. W., Schouten, S., Hopmans, E. C., Abbas, B., Noordeloos, A. A., Geenevasen, J. A., Moldowan, J. M., Denisevich, P., Damste, J. S.
2009; 40 (2): 219-228
- **History of life from the hydrocarbon fossil record** *Handbook of Hydrocarbon microbiology: microbial interactions with hydrocarbons, oils, fats and related hydrophobic substrates and products*
Walters, C. C., Peters, K. E., Moldowan, J. M.
edited by Timmis, K. N.
2009
- **Molecular biosignatures** *SPACE SCIENCE REVIEWS*
Summons, R. E., Albrecht, P., McDonald, G., Moldowan, J. M.
2008; 135 (1-4): 133-159
- **Origins of thiadiamondoids and diamondoidthiols in petroleum** *ENERGY & FUELS*
Wei, Z., Moldowan, J. M., Fago, F., Dahl, J. E., Cai, C., Peters, K. E.
2007; 21 (6): 3431-3436
- **Organic geochemistry of oil and source rock strata of the Ordos Basin, north-central China** *AAPG BULLETIN*
Hanson, A. D., Ritts, B. D., Moldowan, J. M.
2007; 91 (9): 1273-1293
- **Diamondoid hydrocarbons as a molecular proxy for thermal maturity and oil cracking: Geochemical models from hydrous pyrolysis** *ORGANIC GEOCHEMISTRY*
Wei, Z., Moldowan, J. M., Zhang, S., Hill, R., Jarvie, D. M., Wang, H., Song, F., Fago, F.
2007; 38 (2): 227-249
- **The abundance and distribution of diamondoids in biodegraded oils from the San Joaquin Valley: Implications for biodegradation of diamondoids in petroleum reservoirs** *ORGANIC GEOCHEMISTRY*
Wei, Z., Moldowan, J. M., Peters, K. E., Wang, Y., Xiang, W.
2007; 38 (11): 1910-1926
- **The fate of diamondoids in coals and sedimentary rocks** *GEOLOGY*
Wei, Z., Moldowan, J. M., Jarvie, D. M., Hill, R.
2006; 34 (12): 1013-1016
- **Biogeochemical evidence for the presence of the angiosperm molecular fossil oleanane in Paleozoic and Mesozoic non-angiospermous fossils** *PALEOBIOLOGY*
Taylor, D. W., Li, H. Q., Dahl, J., Fago, F. J., Zinniker, D., Moldowan, J. M.

2006; 32 (2): 179-190

- **The catalytic effects of minerals on the formation of diamondoids from kerogen macromolecules** *ORGANIC GEOCHEMISTRY*
Wei, Z., Moldowan, J. M., Dahl, J., Goldstein, T. P., Jarvie, D. M.
2006; 37 (11): 1421-1436
- **Diamondoids and molecular biomarkers generated from modern sediments in the absence and presence of minerals during hydrous pyrolysis** *ORGANIC GEOCHEMISTRY*
Wei, Z., Moldowan, J. M., Paytan, A.
2006; 37 (8): 891-911
- **Geochemical characteristics of oil and source rocks and implications for petroleum systems, Talara basin, northwest Peru** *AAPG BULLETIN*
Fildani, A., Hanson, A. D., Chen, Z. Z., Moldowan, J. M., Graham, S. A., Arriola, P. R.
2005; 89 (11): 1519-1545
- **Molecular records of northern California vegetation change** *15th Annual V M Goldschmidt Conference*
Nylen, N. M., Zinniker, D. A., Denisevich, P., Moldowan, J. M., Ingle, J. C.
PERGAMON-ELSEVIER SCIENCE LTD.2005: A348-A348
- **Pronounced occurrence of long-chain alkenones and dinosterol in a 25,000-year lipid molecular fossil record from Lake Titicaca, South America** *GEOCHIMICA ET COSMOCHIMICA ACTA*
Theissen, K. M., Zinniker, D. A., Moldowan, J. M., Dunbar, R. B., Rowe, H. D.
2005; 69 (3): 623-636
- **The Biomarker Guide, 2nd Edition. I. Biomarkers and Isotopes in the Environment and Human History**
Peters, K. K., Walters, C. C., Moldowan, J. M.
Cambridge University Press, 471 pages.2005
- **The Biomarker Guide, 2nd Edition. II. Biomarkers and Isotopes in Petroleum Exploration and Earth History**
Peters, K. K., Walters, C. C., Moldowan, J. M.
Cambridge University Press, Cambridge, 679 pp..2005
- **The rise of the rhizosolenid diatoms** *SCIENCE*
Damste, J. S., Muyzer, G., Abbas, B., Rampen, S. W., Masse, G., Allard, W. G., Belt, S. T., Robert, J. M., Rowland, S. J., Moldowan, J. M., Barbanti, S. M., Fago, F. J., Denisevich, et al
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- **Controls of oil family distribution and composition in nonmarine petroleum systems: A case study from the Turpan-Hami basin, northwestern China** *AAPG BULLETIN*
Greene, T. J., Zinniker, D., Moldowan, J. M., Keming, C., Aiguo, S.
2004; 88 (4): 447-481
- **Geochemical characteristics and correlation of oil and nonmarine source rocks from Mongolia** *AAPG BULLETIN*
Johnson, C. L., Greene, T. J., Zinniker, D. A., Moldowan, J. M., Hendrix, M. S., Carroll, A. R.
2003; 87 (5): 817-846
- **Isolation and structural proof of the large diamond molecule, cyclohexamantane (C₂₆H₃₀)** *ANGEWANDTE CHEMIE-INTERNATIONAL EDITION*
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2003; 42 (18): 2040-2044
- **Umir Formation: Organic geochemical and stratigraphic assessment as cosource for Middle Magdalena basin oil, Colombia** *AAPG BULLETIN*
Rangel, A., Moldowan, J. M., Nino, C., Parra, P., Giraldo, B. N.
2002; 86 (12): 2069-2087
- **The abnormal distribution of the molecular fossils in the pre-Cambrian and Cambrian: its biological significance** *SCIENCE IN CHINA SERIES D-EARTH SCIENCES*
Zhang, S. C., Moldowan, J. M., Li, M. W., Bian, L. Z., Zhang, B. M., Wang, F. Y., He, Z. H., Wang, D. R.

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Moldowan, J. M.
2002
- **Upper Oligocene lacustrine source rocks and petroleum systems of the northern Qaidam basin, northwest China** *AAPG BULLETIN*
Hanson, A. D., Ritts, B. D., Zinniker, D., Moldowan, J. M., Biffi, U.
2001; 85 (4): 601-619
- **Petroleum geochemistry applied to petroleum system investigation** *Petroleum Systems of South Atlantic Margins: AAPG Memoir 73*
Mello, M. R., Moldowan, J. M., Dahl, J., Requejo, A. G.
edited by Mello, M. R., Katz, B. J.
2001: 41-52
- **Stereoselective biodegradation of tricyclic terpanes in heavy oils from the Bolivar Coastal Fields, Venezuela** *ORGANIC GEOCHEMISTRY*
ALBERDI, M., Moldowan, J. M., Peters, K. E., Dahl, J. E.
2001; 32 (1): 181-191
- **Molecular fossils demonstrate Precambrian origin of dinoflagellates** *Ecology of the Cambrian Radiation*
Moldowan, J. M., Jacobson, S. R., Dahl, J., Al-Hajji, A., Huizinga, B. J., Fago, F. J.
edited by Zhuravlev, A., Riding, R.
Columbia University Press.2001
- **Chemical signals for early evolution of major taxa: Biosignatures and taxon-specific biomarkers** *INTERNATIONAL GEOLOGY REVIEW*
Moldowan, J. M., Jacobson, S. R.
2000; 42 (9): 805-812
- **Molecular organic geochemistry of the Tarim basin, northwest China** *AAPG BULLETIN*
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- **Trails of life** *CHEMISTRY IN BRITAIN*
Moldowan, M.
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- **Biomarkers** *McGraw-Hill Yearbook of Science & Technology*
Moldowan, J. M.
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- **Paleozoic oil-source rock correlations in the Tarim basin, NW China** *ORGANIC GEOCHEMISTRY*
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- **Affinities of Early Cambrian acritarchs studied by using microscopy, fluorescence flow cytometry and biomarkers** *REVIEW OF PALAEOBOTANY AND PALYNOLOGY*
Talyzina, N. M., Moldowan, J. M., Johannisson, A., Fago, F. J.
2000; 108 (1-2): 37-53
- **Lower-middle Jurassic nonmarine source rocks and petroleum systems of the northern Qaidam basin, northwest China** *AAPG BULLETIN*
Ritts, B. D., Hanson, A. D., Zinniker, D., Moldowan, J. M.
1999; 83 (12): 1980-2005
- **Diamondoid hydrocarbons as indicators of natural oil cracking** *NATURE*
Dahl, J. E., Moldowan, J. M., Peters, K. E., Claypool, G. E., Rooney, M. A., Michael, G. E., Mello, M. R., Kohnen, M. L.
1999; 399 (6731): 54-57
- **Distribution and characterization of C-31 sterane from cretaceous sediments and oils, Songliao Basin, China** *CHINESE SCIENCE BULLETIN*
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1999; 44 (6): 560-563

- **Application of new diterpane biomarkers to source, biodegradation and mixing effects on Central Llanos Basin oils, Colombia** *ORGANIC GEOCHEMISTRY*
Dzou, L. I., Holba, A. G., Ramon, J. C., Moldowan, J. M., Zinniker, D.
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Holba, A. G., Tegelaar, E. W., Huizinga, B. J., Moldowan, J. M., Singletary, M. S., McCaffrey, M. A., Dzou, L. I.
1998; 26 (9): 783-786
- **Biogeochemical evidence for dinoflagellate ancestors in the Early Cambrian** *SCIENCE*
Moldowan, J. M., Talyzina, N. M.
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- **Application of 24-norcholestanes for constraining source age of petroleum** *18th International Meeting on Organic Geochemistry*
Holba, A. G., Dzou, L. I., Masterson, W. E., Hughes, W. B., Huizinga, B. J., Singletary, M. S., Moldowan, J. M., Mello, M. R., Tegelaar, E.
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- **Selective biodegradation of extended hopanes to 25-norhopanes in petroleum reservoirs. Insights from molecular mechanics** *Symposium on Biodegradation of Petroleum, at the American-Chemical-Society National Meeting*
Peters, K. E., Moldowan, J. M., McCaffrey, M. A., Fago, F. J.
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Fensome, R. A., MacRae, R. A., Moldowan, J. M., Taylor, F. J., Williams, G. L.
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- **Stereoselective biodegradation of hopane epimers to 25-norhopanes in petroleum.**
Peters, K. E., Moldowan, J. M., McCaffrey, M. A., Fago, F. J.
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- **Chemostratigraphic reconstruction of biofacies: Molecular evidence linking cyst-forming dinoflagellates with pre-Triassic ancestors** *GEOLOGY*
Moldowan, J. M., Dahl, J., Jacobson, S. R., Huizinga, B. J., Fago, F. J., Shetty, R., Watt, D. S., Peters, K. E.
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- **A NOVEL MICROBIAL HYDROCARBON DEGRADATION PATHWAY REVEALED BY HOPANE DEMETHYLATION IN A PETROLEUM RESERVOIR** *GEOCHIMICA ET COSMOCHIMICA ACTA*
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1975; 26 (1): 107-128
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