

Dr. Wenjian Lao

Chemist

Chemistry Department

Southern California Coastal Water Research Project

Education

Ph.D., analytic chemistry, Lanzhou Institute of Chemical Physics (LICP), Chinese Academy of Sciences (CAS), 2000

M.S., analytic chemistry, LICP, CAS, 1996

B.S., chemistry, Xi'an Petroleum Institute, P.R. China, 1990

Professional Experience

Chemist, Southern California Coastal Water Research Project. Costa Mesa, CA. 2006-present

Postdoctoral Researcher, University of California, Riverside, Department of Environmental Sciences. Riverside, CA. 2005-2006

Postdoctoral Associate, Mississippi State University, Chemistry Department. Mississippi State, MS. 2003-2005

Research Associate, Vanderbilt University, Department of Chemistry. Nashville, TN. 2003

Research Scientist, The Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences. Beijing, P.R. China. 2001-2003

Graduate Student Researcher, Lanzhou Institute of Chemical Physics, Chinese Academy of Sciences. Lanzhou, P.R. China. 1995-2000

Engineer, Analytical Chemistry Division, Geochemical Crews, BGP Inc., China National Petroleum Corporation. Zhuozhou, P.R. China. 1990-2002

Honors and Awards

Principal investigator, China Postdoctoral Science Foundation (2001)

The Peng Yingang Science and Technology Fellowship, Chinese Academy of Science (2000)

Achievement Award of Quality Control, China National Petroleum Corporation (1995)

Professional Societies and Certifications

Board of Directors, Southern California Regional Chapter of the Society of Environmental Toxicology and Chemistry (SoCal SETAC) (2008-2010)

Hydrology & Watershed Management Committee, American Water Resources Association

American Chemical Society

Sigma Xi

Selected Presentations and Conference Proceedings

Lao W, Parks A, Wenger E, Maruya M, Bay B, Carilli J and Leather J. 2019. Characterizing freely dissolved polychlorinated biphenyls and organochlorine pesticides in San Diego Bay (CA, USA) using polyethylene passive samplers. SETAC North America 40th Annual Meeting. November, Toronto, ON, CA.

Lao W, Kim G, and Maruya K, 2017. Developing passive sampling methods for bioavailable current-used pesticides in sediment. 253rd American Chemical Society National Meeting & Exposition. San Francisco, California.

Maruya, K., Lao, W., Kim, G.B., Hong, Y., Gan, J. 2016. Extending the scope of passive sampling for contaminated sediments: standardizing ex situ methods for determination of C_{free}. 7th SETAC World Congress/SETAC North America 37th Annual Meeting. November, Orlando, FL.

Flavetta G., Lao W, K.A. Maruya. R.M. Burgess, L. Fernandez. 2016. Temporal and spatial monitoring of persistent organic pollutants on the Palos Verdes Shelf using two passive sampling methods. 7th SETAC World Congress/SETAC North America 37th Annual Meeting. November, Orlando, FL.

Hong Y, Lao W, David Tsukada D, Maruya K, Gan J. 2015. Evaluation of various polymers for equilibrium passive sampling of moderately hydrophobic emerging pollutants in water. Platform presentation at SETAC North America 36th annual meeting. November, Salt Lake City.

Lao W, Tsukada D, Maruya M. 2014. Incorporating performance reference compounds (PRCs) for passive sampling of organic contaminants using solid phase microextraction (SPME). Poster presentation at SETAC North America 35th annual meeting. November, Vancouver.

Lao W, Tsukada D, Maruya M. 2013. Correction for non-equilibrium measurement of hydrophobic organic chemicals using polyethylene passive samplers. Poster presentation at SETAC North America 34th annual meeting. November, Nashville.

Lao W, Tsukada D, Maruya M. 2012. Linkage between laboratory and field exposures of low-density polyethylene film as passive sampler in seawater. Poster presentation at SETAC North America 33rd annual meeting. November, Long Beach, CA.

Pirogovsky, M., A. Joyce, W. Lao, J. Haw, R. Adams, and K. Maruya. 2012. Calibrating Solid Phase Microextraction Passive Samplers for the In Situ Measurement of Contaminants in Southern California. American Chemical Society 243rd National Meeting & Exposition. San Diego, CA.

Joyce, A., M. Pirogovsky, W. Lao, J. Haw, R. Adams, and K. Maruya. 2012. Measurement of Polyethylene-Water partition Coefficients for In Situ Passive Sampling of Contaminants of Emerging Concern in Los Angeles, California. American Chemical Society 243rd National Meeting & Exposition. San Diego, CA.

Lao, W., L. Tiefenthaler, D. Greenstein, K.A. Maruya, S.M. Bay, and K.C. Schiff. 2011. Pyrethroids in Sediment from Southern California Coastal Environment-Bight'08 Survey. Presentation at the American Chemical Society 242nd National Meeting & Exposition. Denver, CO.

Adams, G.R, A.S. Joyce, M.S. Pirogovsky, W. Lao, J.F. Haw, and K.A. Maruya. 2011. Calibration and use of Polyethylene Passive Samplers for Quantifying Legacy and Emerging Contaminants of Concern at POTW Outfalls. Presentation at the Annual Water Environment Federation Technical Exhibition and Conference (WEFTEC). Los Angeles, CA.

Lao, W., L. Tiefenthaler, D. Greenstein, K.A. Maruya, S.M. Bay, and K.C. Schiff. 2011. Pyrethroids in Sediment from Southern California Coastal Environment-Bight'08 Survey. Presentation at SoCal SETAC Annual Meeting. Huntington Beach, CA.

Journal Articles

Lao, W. 2020. Fiproles as a proxy for ecological risk assessment of mixture of fipronil and its degradates in effluent-dominated surface waters. *Water Research*
DOI:10.1016/j.watres.2020.116510.

Alava, J.J., P. Calle, A. Tirape, G. Biedenbach, O.A. Cadena, K. Maruya, W. Lao, W. Aguirre, P.J. Jimenez, G.A. Dominguez, G.D. Bossart, P.A. Fair. 2020. Persistent Organic Pollutants and Mercury in Genetically Identified Inner Estuary Bottlenose Dolphin (*Tursiops truncatus*) Residents of the Guayaquil Gulf, Ecuador: Ecotoxicological Science in Support of Pollutant Management and Cetacean Conservation. *Frontiers in Marine Science* DOI:10.3389/fmars.2020.00122.

Wang, S., W. Lao, H. Li, J. You. 2020. Measuring bioconcentration factors of sediment-associated fipronil in *Lumbriculus variegatus* using passive sampling techniques. *Journal of Hazardous Materials* DOI:10.1016/j.jhazmat.2020.122420.

Lao, W., K.A. Maruya, D. Tsukada. 2019. An exponential model based new approach for correcting aqueous concentrations of hydrophobic organic chemicals measured by polyethylene passive samplers. *Science of the Total Environment* 646:11-18.

Jonker, M.T.O., S.A. van der Heijden, D. Adelman, J.N. Apell, R.M. Burgess, Y. Choi, L.A. Fernandez, G.M. Flavetta, U. Ghosh, P.M. Gschwend, S.E. Hale, M. Jalalizadeh, M. Khairy, M.A. Lampi, W. Lao, R. Lohman, M.J. Lydy, K.A. Maruya, S.A. Nutile, A.M.P. Oen, M.I. Rakowska, D. Reible, T.P. Rusina, F. Smedes, Y. Wu. 2018. Advancing the Use of Passive Sampling in Risk Assessment and Management of Sediments Contaminated with Hydrophobic Organic Chemicals: Results of an International Ex Situ Passive Sampling Interlaboratory Comparison. *Environmental Science and Technology* 52:3574-3582.

Ulrich, E.M., P.L. TenBrook, L.M. McMillan, Q. Wang, W. Lao. 2018. Enantiomer-Specific Measurements of Current-Use Pesticides in Aquatic Systems. *Environmental Toxicology and Chemistry* 37:99-106.

Lin, K., W. Lao, Z. Lu, F. Jia, K.A. Maruya, J. Gan. 2017. Measuring freely dissolved DDT and metabolites in seawater using solid-phase microextraction with performance reference compounds. *Science of the Total Environment* 599-600:364-371.

Mehinto, A.C., D.R. VanDervort, W. Lao, G. He, M.S. Denison, S.M. Vliet, D.C. Volz, R.D. Mazor, K.A. Maruya. 2017. High throughput in vitro and in vivo screening of inland waters of Southern California. *Environmental Science: Processes and Impacts* 19:1142-1149.

Lao, W., Y. Hong, D. Tsukada, K.A. Maruya, J. Gan. 2016. A New Film-Based Passive Sampler for

Moderately Hydrophobic Organic Compounds. *Environmental Science and Technology* 50:13470-13476.

Crago, J., E.G. Xu, A. Kupsco, F. Jia, A.C. Mehinto, W. Lao, K.A. Maruya, J. Gan, D. Schlenk. 2016. Trophic transfer and effects of DDT in male hornyhead turbot (*Pleuronichthys verticalis*) from Palos Verdes Superfund site, CA (USA) and comparisons to field monitoring. *Environmental Pollution* 213:940-948.

Maruya, K.A., W. Lao, D. Tsukada, D.W. Diehl. 2015. A passive sampler based on solid phase microextraction (SPME) for sediment-associated organic pollutants: Comparing freely-dissolved concentration with bioaccumulation. *Chemosphere* 137:192-197.

Joyce, A.S., M.S. Pirogovsky, R.G. Adams, W. Lao, D. Tsukada, C.L. Cash, J.F. Hawa, K.A. Maruya. 2015. Using performance reference compound-corrected polyethylene passive samplers and caged bivalves to measure hydrophobic contaminants of concern in urban coastal seawaters. *Chemosphere* 127:10-17.

Fernandez, L.A., W. Lao, K.A. Maruya, R.M. Burgess. 2014. Calculating the diffusive flux of persistent organic pollutants between sediments and the water column on the Palos Verdes Shelf Superfund Site using polymeric passive samplers. *Environmental Science and Technology* 48:3925-3934.

Greenstein, D.J., S.M. Bay, D.L. Young, S. Asato, K.A. Maruya, W. Lao. 2014. The use of sediment toxicity identification evaluation methods to evaluate clean up targets in an urban estuary. *Integrated Environmental Assessment and Management* 10:260-268.

Alvarez, D.A., K.A. Maruya, N.G. Dodder, W. Lao, E.T. Furlong, K.L. Smalling. 2014. Occurrence of contaminants of emerging concern along the California coast (2009-10) using passive sampling devices. *Marine Pollution Bulletin* 81:347-354.

Maruya, K.A., N.G. Dodder, C.L. Tang, W. Lao, D. Tsukada. 2014. Which coastal and marine environmental contaminants are truly emerging?. *Environmental Science and Pollution Research* 22:1644-1652.

Fernandez, L.A., W. Lao, K.A. Maruya, C. White, R.M. Burgess. 2012. Passive sampling to measure baseline dissolved persistent organic pollutant concentrations in the water column of the Palos Verdes shelf superfund site. *Environmental Science and Technology* 46:11937-11947.

Lao, W., J. Gan. 2012. Enantioselective degradation of warfarin in soils. *Chirality* 24:54-59.

Lao, W., D. Tsukada, K.A. Maruya. 2012. The effect of co-occurring polychlorinated biphenyls on quantitation of toxaphene in fish tissue samples by gas chromatography negative ion mass spectrometry. *Journal of Chromatography A* 1270:262-268.

- Lao, W., L.L. Tiefenthaler, D.J. Greenstein, K.A. Maruya, S.M. Bay, K. Ritter, K.C. Schiff. 2012. Pyrethroids in southern California coastal sediments. *Environmental Toxicology and Chemistry* 31:1649-1656.
- Lao, W., K.A. Maruya, D. Tsukada. 2012. A two-component mass balance model for calibration of solid-phase microextraction fibers for pyrethroids in seawater. *Analytical Chemistry* 84:9362-9369.
- Lao, W., J. Gan. 2010. Characterization of warfarin unusual peak profiles on oligoproline chiral high performance liquid chromatography columns. *Journal of Chromatography A* 1217:6545-6554.
- Lao, W., J. Gan. 2010. Temperature effects on a doubly tethered diproline chiral stationary phase: Hold-up volume, enantioselectivity and robustness. *Journal of Separation Science* 33:3052-3059.
- Lao, W., D. Tsukada, D.J. Greenstein, S.M. Bay, K.A. Maruya. 2010. Analysis, occurrence, and toxic potential of pyrethroids, and fibronil in sediments from an urban estuary. *Environmental Toxicology and Chemistry* 29:843-851.
- Ramezani, M.K., D.P. Oliver, R.S. Kookana, W. Lao, G. Gill, C. Preston. 2010. Faster degradation of herbicidally-active enantiomer of imidazolinones in soils. *Chemosphere* 79:1040-1045.
- Sabin, L.D., K.A. Maruya, W. Lao, D.W. Diehl, D. Tsukada, K.D. Stolzenbach, K.C. Schiff. 2010. Exchange of polycyclic aromatic hydrocarbons among the atmosphere, water, and sediment in coastal embayments of southern California, USA. *Environmental Toxicology and Chemistry* 29:265-274.
- Lao, W., J. Gan. 2009. Doubly tethered tertiary amide linked and ionically bonded diproline chiral stationary phases. *Journal of Separation Science* 32:2359-2368.
- Lao, W., J. Gan. 2009. Evaluation of triproline and tri-a-methylproline chiral stationary phases retention and enantioseparation associated with hydrogen bonding. *Journal of Chromatography A* 1216:5020-5029.
- Lao, W., J. Gan. 2008. Characterization of column hold-up volume with static and dynamic methods on an immobilized polysaccharide-based chiral stationary phase. *Chromatographia* 67:3-7.
- Lao W., L. Cong, T. Hong, J. You, 2015. Spectroscopic Characterizations of Semiquinone Anion Radical Formation and Autosensitized Photooxidation for Elsinochrome A. *Journal of the Chemical Society of Pakistan*. 37 (1), 99-104.
- Lao W., L. Cong, T. Hong, J. You. 2014. Photoinduced electron-transfer between Elsinochrome A and carbazole chemicals. *Chemical Research*. 25 (3), 260-263.

Lao W. 2013. Analysis of toxaphene and its eight congeners in sediment and fish tissue by gas chromatography-negative ion mass spectrometry. *Chinese Journal of Chromatography*. 31(7): 667-673.

Lao W. 2013. Thermodynamic and Extrathermodynamic Studies of Enantioseparation of Imidazolinone Herbicides on Chiralcel OJ Column. *ISRN Chromatography*. Article ID 460787, 9 pages. doi:10.1155/2013/460787.

Lao W., C. Song, J. You, Q. Ou. 2013. Fluorescence derivatization of alcohols by 1,4-dimethyl-carbazole-9-yl-propionic acid. *Chemical Research*. 24 (1), 75-78.

Lao W., C. Song, J. You, Q. Ou. 2012. Fluorescence and β -cyclodextrin inclusion properties of three carbazole-based dyes. *Dyes and Pigments*. 95, 619-626.

Lao W., L. Cong, T. Hong, J. You. 2012. Theoretical study on molecular configuration and intramolecular hydrogen bond of Elsinochrome A. *Chemical Research*. 23 (4), 85-90.

Lao W., C. Song, J. You, Q. Ou. 2012. Bifurcated hydrogen-bond in 3-Br-carbazole-9-yl-acetic acid crystal and its theoretical analysis. *Chemical Research*. 23 (5), 40-43.

Lao W., G. Arye, F. Ernst, Y.P. Xu, S. Bondarenko, D. Haver, J. Kabashima, D. Shibberu, and J. Gan. 2008. Reduction of Pyrethroid Runoff from A Commercial Nursery, in Synthetic Pyrethroids: Occurrence and Behavior in Aquatic Environments. *American Chemical Society*. ISBN: 978-0-8412-7433-4. 428-446.

Lao W., J. Gan. 2007. Hold-up volume and its application in estimating effective phase ratio and thermodynamic parameters on a polysaccharide-coated chiral stationary phase. *Journal of Separation Sciences*, 30, 2590-2597.

Lao W., J. Gan. 2006. Responses of enantioselective characteristics of imidazolinone herbicides and Chiralcel OJ column to temperature variations. *Journal of Chromatography A*, 1131 (1-2) 74-84.

Lao W., J. Gan. 2006. High-performance liquid chromatographic separation of imidazolinone herbicide enantiomers and their methyl derivatives on polysaccharide-coated chiral stationary phases. *Journal of Chromatography A*, 1117 (2), 184-193.

Zhang G., R. E. Rogers, W. T. Frenca and Lao W.. 2006. Investigation of microbial influences on seafloor gas-hydrate formations. *Marine Chemistry*. 103 (3-4) 359-369.

Zhao R., Lao W., X. Xu. 2004. Headspace Liquid-Phase Microextraction of Trihalomethanes in Drinking Water and Their Gas-Chromatographic Determination. *Talanta*. 62, 751-756.

Ma L., Lao W., X. Wang, H. Liu, S. Chu, X. Xu. 2003. Analytical method for trace semi-volatile organic compounds in the soil of Beijing suburbs. *Chinese Analytical Chemistry*, 31(9), 1025-1029.

Liu X., Lao W., X. Bi, X. Xu, J. Zhao. 2002. Determination of organochlorine pesticides in abalone samples from Antarctic. Research Center for Eco-environmental Sciences, Chinese Academy of Sciences, Beijing, Peop. Rep. China. *Chinese Analytical Chemistry* 30(9), 1035-1037.

You J., Lao W.,; M. Huang, G. Wang. 2002. Study of molecular imprinted polymer as the adsorbent in the clean-up step after supercritical fluid extraction. Lanzhou Institute of Chemical Physics, Chinese Academy of Sciences, Lanzhou, Peop. Rep. China. *Chinese Analytical Chemistry* 30(5), 518-521.

Bi Y., Lao W.,; Zhao, Suli; Li, Jubai. 2001. Synthesis and structure identification of partly hexenyl-substituted β -cyclodextrin. *Journal of Chemical reagents*. 23(5), 284-285.

Lao W., Yu Hua Zhang, Yue Qi Liu, Qing Jin Wu, Zi Xing Huang, Qing Yu Ou, 2001. The Microwave-assisted Preparation and X-Ray Structure of 3-Bromo-9-carbazoly-N-acetic acid. *Chinese Chemical Letter*, 12(4) 321-324.

Lao W., J. You, H. Lu, S. Chen, X. Shen and Q. Ou, 2001. Study on the Synthesis, Properties and Biological Activities of (9-Carbazoly)-carboxylic acids. *Chemical Journal of Chinese Universities*, 22(6) 955-957

Lao W., J. You, J. M. You, G. Wang, Q. Ou 2001. The Advances of fluorescence derivatization for alcohols and acids in high-performance liquid chromatography. *Analysis and Testing Technology and Instruments*. 7(1) 28-36.

You J, Lao W., G. Wang. 2001. Enantiomeric Separation of Pesticides by High Performance Capillary Electrophoresis. *Analysis and Testing Technology and Instruments*. 7(2) 100-104.

You J., Lao W., S. Chen, Q. Ou, 2001. Molecular Imprinted Polymer Used as An Additive for High Performance Capillary Electrophoresis. *J. of Instrumental Analysis*, 20(1) 19.

Zhang Y., Lao W., Y. Yin, Z. Huang, J. Wu, 2001. The Reaction of Octacarbonyldicobalt and Dipropargyl Malonate. *Chinese Journal of Structure Chemistry*, 20, 104

Zhang Y., J. Zhang, Lao W., Y. Yin, Z Huang and J. Wu, 2001. Synthesis, characterization and reactions of cluster complexes containing SeRuCoM (M = Mo or W) core and a functionally substituted cyclopentadienyl ligand. *Journal of Organomet. Chemistry*, 628(1) 123-130.

Zhang Y, Zhang J, Lao W., Y., Z. Huang and J. Wu, 2002. The reaction of octacarbonyldicobalt and dipropargyl terephthalate. *Journal of coordination chemistry* 2002 55(4) 373-380.

- Zhang Y., Lao W., Y. Liu, Y. Yin, J. Wu and Z. Huang, 2001. Reaction of dipropargyl manolate, terephthalate with $\text{Co}_2(\text{CO})_8$, $\text{Mo}_2\text{Cp}_2(\text{CO})_4$ and $\text{RuCo}_2(\text{CO})_{11}$ gives the di or tetranuclear clusters. The crystal structure of $[\text{CH}_2(\text{CO}_2\text{CH}_2\text{C}_2\text{H}_5)_2][\text{Co}_2(\text{CO})_6]_2$ and $[\text{p}-(\text{HC}_2\text{CH}_2\text{OCO})\text{C}_6\text{H}_4(\text{CO}_2\text{CH}_2\text{C}_2\text{H}_5)_2][\text{Co}_2(\text{CO})_6]$. *Polyhedron*, 20(9-10) 1107-1113.
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- Lao W., J.M. You, X. Sun, X. Kong, Q. Ou. 2000. Rapid Preparation of 1,4-Dimethyl-Carbazole-9-Carboxylic acid under Microwave Irradiation. *Chinese Journal of Synthetic Chemistry*. 8 (1) 6.
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49, 95-104.

You J.M., X.J.Sun, Lao W., Q.Y.Ou, 1999. Determination of alcohols using condensation agent carbazole-9-acetyl-benzene-disulfonate by high performance liquid chromatography with pre-column fluorescence derivatization, *Chromatographia*, 49, 657-665.

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X. Suo, Lao W., 1999. Study on the Geochemical Prospecting System of Near the Earth's Surface Free Hydrocarbons and Its Applied Effect. *Petroleum Explorationist*. 4(1) 35.

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You J.M., X. Sun, Lao W., Q. Ou, D. Jiang, 1999. Derivatization of alcohols using acridone-9-N-acetyl-benzene-disulfonate as a condensation agent and its application for the determination of volatile alcohols in human plasma by liquid chromatography with fluorescence detection, *Anal.Chim.Acta*, 391, 43-55.

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Lao W., G.Wang, 1995. The rapid analysis of free hydrocarbon by gas chromatography in field for oil and gas geochemical prospecting. *Analysis and Testing Technology and Instruments*. 1 (3) 28.

Technical Reports

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Dodder, N., W. Lao, D. Tsukada, D.W. Diehl, K.C. Schiff. 2014. Areas of Special Biological Significance: Bioaccumulation Monitoring. Technical Report 816. Southern California Coastal Water Research Project. Costa Mesa, CA.

Schiff, K.C., R. Gossett, K. Ritter, L.L. Tiefenthaler, N. Dodder, W. Lao, K.A. Maruya. 2011. Southern California Bight 2008 Regional Monitoring Program: III. Sediment Chemistry. Technical Report 661. Southern California Coastal Water Research Project. Costa Mesa, CA.

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Bay, S.M., D.J. Greenstein, K.A. Maruya, W. Lao. 2010. Toxicity Identification Evaluation of Sediment (Sediment TIE) in Ballona Creek Estuary: Final Report. Technical Report 634. Southern California Coastal Water Research Project. Costa Mesa, CA.

Peng, J., K.A. Maruya, K.C. Schiff, D. Tsukada, D.W. Diehl, W. Lao, J. Gan, E. Zeng. 2007. Organochlorine pesticides and other trace organic contaminants in the Upper Newport Bay watershed. Technical Report 512. Southern California Coastal Water Research Project. Costa

Mesa, CA.

Annual Report Articles

Greenstein, D.J., S.M. Bay, D. Young, S. Asato, K.A. Maruya, W. Lao. 2013. The use of sediment toxicity identification evaluation methods to evaluate clean-up targets in an urban estuary.

Alvarez, D., K.A. Maruya, N.G. Dodder, W. Lao, E. Furlong, K. Smalling. 2013. Occurrence of contaminants of emerging concern along the California coast (2009-10) using passive sampling devices.

Fernandez, L.A., W. Lao, K.A. Maruya, C. White, R.M. Burgess. 2012. Passive sampling to measure background dissolved persistent organic pollutant concentrations in the water column of the Palos Verdes Shelf Superfund site.

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