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Biography

Our research group is broadly focused on organic and organometallic materials chemistry. The central theme of our research involves the rational design and creation of novel molecular and macromolecular structures for light emitting devices (energy to light conversion), solar cells (light to energy conversion) and molecular electronic applications. Our current goals involve investigations into achieving highly stable and luminescent triplet phosphors based on organometallic complexes by creation of new metal-ligand interactions. In the field of molecular electronics, we pursue different functionalization strategies of organic and organometallic systems to tailor their electronic properties to achieve molecular memory devices.

Our group is exposed to a broad range of topics including synthetic chemistry, organic chemistry, polymer chemistry, inorganic chemistry, organometallic chemistry and photochemistry.

The following topics are currently under investigation:

Organic and Organometallic Materials Chemistry

Organometallic light emitting molecules

Electronic materials and molecular electronics

Research output

Towards blue emitting monocyclometalated gold(III) complexes-synthesis, characterization and photophysical investigations

Bachmann, M., Fessler, R., Blacque, O. & Venkatesan, K., 7 Jun 2019, In : Dalton Transactions. 48, 21, p. 7320-7330 11 p.

Thermally robust and tuneable phosphorescent gold(III) complexes bearing (N^N)-type bidentate ligands as ancillary chelates

Malmberg, R., Bachmann, M., Blacque, O. & Venkatesan, K., 7 Mar 2019, In : Chemistry - A European Journal. 25, 14, p. 3627-3636 10 p.

Nickel catalyzed synthesis of 4,4'-bichromenes/4,4'-bithiochromenes and their Atropisomerism

Muthuramalingam, S., Garg, J. A., Karthick, R., Fox, T., Blacque, O., Venkatesan, K., Ramanathan, S., Kabilan, S. & Balasubramanian, K. K., 7 Jan 2019, In : Organic Chemistry Frontiers. 6, 1, p. 134-139 6 p.

Tunable membrane potential reconstituted in giant vesicles promotes permeation of cationic Peptides at nanomolar concentrations

Lin, C-C., Bachmann, M., Bachler, S., Venkatesan, K. & Dittrich, P. S., 12 Dec 2018, In : ACS Applied Materials and Interfaces. 10, 49, p. 41909-41916 8 p.

Highly stable and strongly emitting N-heterocyclic carbene platinum(II) biaryl complexes

Suter, D., van Summeren, L. T. C. G., Blacque, O. & Venkatesan, K., 16 Jul 2018, In : Inorganic Chemistry. 57, 14, p. 8160-8168 9 p.

Metallic nanoparticle contacts for high-yield, ambient-stable molecular-monolayer devices

Puebla-Hellmann, G., Venkatesan, K., Mayor, M. & Lörtscher, E., 12 Jul 2018, In : Nature. 559, p. 232-235 4 p.

Harnessing white-light luminescence via tunable singlet-and triplet-derived emissions based on gold(III) complexes *

Bachmann, M., Blacque, O. & Venkatesan, K., 18 Jul 2017, In : Chemistry - A European Journal. 23, 40, p. 9451-9456 6 p.

Stable N-heterocyclic carbene (NHC) cyclometalated (C[∧]C) gold(III) complexes as blue-blue green phosphorescence emitters

Von Arx, T., Szentkuti, A., Zehnder, T. N., Blacque, O. & Venkatesan, K., 21 Apr 2017, In : Journal of Materials Chemistry C. 5, 15, p. 3765-3769 5 p.

Rationally designed blue triplet emitting gold(III) complexes based on a phenylpyridine-derived framework

Bachmann, M., Terreni, J., Blacque, O. & Venkatesan, K., 2017, In : Chemistry - A European Journal. 23, 16, p. 3837-3849 13 p.

Smectic A mesophases from luminescent sandic platinum(II) mesogens

Krikorian, M., Voll, C. C. A., Yoon, M., Venkatesan, K., Kouwer, P. H. J. & Swager, T. M., 25 Sep 2016, In : Liquid Crystals. 43, 12, p. 1709-1713 5 p.

Charge Transport and Conductance Switching of Redox-Active Azulene Derivatives

Schwarz, F., Koch, M., Kastlunger, G., Berke, H., Stadler, R., Venkatesan, K. & Lörtscher, E., 19 Sep 2016, In : Angewandte Chemie - International Edition. 55, 39, p. 11781-11786 6 p.

Tunable and Efficient White Light Phosphorescent Emission Based on Single Component N-Heterocyclic Carbene Platinum(II) Complexes

Bachmann, M., Suter, D., Blacque, O. & Venkatesan, K., 16 May 2016, In : Inorganic Chemistry. 55, 10, p. 4733-4745 13 p.

Field-induced conductance switching by charge-state alternation in organometallic single-molecule junctions

Schwarz, F., Kastlunger, G., Lissel, F., Egler-Lucas, C., Semenov, S. N., Venkatesan, K., Berke, H., Stadler, R. & Lörtscher, E., Feb 2016, In : Nature Nanotechnology. 11, 2, p. 170-176 7 p.

Electronic communication in phosphine substituted bridged dirhenium complexes - clarifying ambiguities raised by the redox non-innocence of the C₄H₂- and C₄-bridges

Li, Y., Blacque, O., Fox, T., Lubner, S., Polit, W., Winter, R. F., Venkatesan, K. & Berke, H., 2016, In : Dalton Transactions. 45, 13, p. 5783-5799 17 p.

Fabrication of NEMS actuated plasmonic antenna platform for the study of optical forces and field enhancements in hot-spots

Herrmann, L., Olziersky, A., Gruber, C., Puebla-Hellmann, G., Drechsler, U., von Arx, T., Venkatesan, K., Novotny, L. & Lörtscher, E., 2016, *Asia Communications and Photonics Conference 2016: proceedings*. Washington, D.C: OSA - The Optical Society, 3 p. AS4B.2

Monocyclometalated gold(III) complexes bearing π-accepting cyanide ligands: syntheses, structural, photophysical, and electrochemical investigations

Szentkuti, A., Garg, J. A., Blacque, O. & Venkatesan, K., 16 Nov 2015, In : Inorganic Chemistry. 54, 22, p. 10748-10760 13 p.

Stable and color tunable emission properties based on non-cyclometalated gold(III) complexes

Bachmann, M., Blacque, O. & Venkatesan, K., 7 Jun 2015, In : Dalton Transactions. 44, 21, p. 10003-10013 11 p.

Structural and electronic variations of sp/sp(2) carbon-based bridges in di- And trinuclear redox-active iron complexes bearing Fe(diphosphine)X₂ (X = I, NCS) moieties

Lissel, F., Blacque, O., Venkatesan, K. & Berke, H., 26 Jan 2015, In : Organometallics. 34, 2, p. 408-418 11 p.

Fabrication of bow-tie antennas with mechanically tunable gap sizes below 5 nm for single-molecule emission and Raman scattering

Gruber, C. M., Herrmann, L. O., Olziersky, A., Puebla-Hellmann, G. F., Drechsler, U., von Arx, T., Bachmann, M., Koch, M., Lapin, Z. J., Venkatesan, K., Novotny, L. & Lörtscher, E., 2015, *2015 IEEE 15th International Conference on Nanotechnology: IEEE-NANO 2015*. Piscataway, NJ: Institute of Electrical and Electronics Engineers (IEEE), p. 20-24 5 p. 7388978

Organometallic Single-Molecule Electronics: Tuning Electron Transport through X(diphosphine)(2)FeC4Fe(diphosphine)(2)X Building Blocks by Varying the Fe-X-Au Anchoring Scheme from Coordinative to Covalent

Lissel, F., Schwarz, F., Blacque, O., Riel, H., Lörtscher, E., Venkatesan, K. & Berke, H., 15 Oct 2014, In : Journal of the American Chemical Society. 136, 41, p. 14560-14569 10 p.

High-conductive organometallic molecular wires with delocalized electron systems strongly coupled to metal electrodes

Schwarz, F., Kastlunger, G., Lissel, F., Riel, H., Venkatesan, K., Berke, H., Stadler, R. & Lörtscher, E., 8 Oct 2014, In : Nano Letters. 14, 10, p. 5932-5940 9 p.

Luminescent monocyclometalated cationic gold(III) complexes: Synthesis, photophysical characterization and catalytic investigations

Zehnder, T. N., Blacque, O. & Venkatesan, K., 21 Aug 2014, In : Dalton Transactions. 43, 31, p. 11959-11972 14 p.

Metal-free triplet phosphors with high emission efficiency and high tunability

Koch, M., Perumal, K., Blacque, O., Garg, J. A., Saiganesh, R., Kabilan, S., Balasubramanian, K. K. & Venkatesan, K., 16 Jun 2014, In : Angewandte Chemie - International Edition. 53, 25, p. 6378-6382 5 p.

Monocyclometalated gold(III) monoaryl complexes - A new class of triplet phosphors with highly tunable and efficient emission properties

Szentkuti, A., Bachmann, M., Garg, J. A., Blacque, O. & Venkatesan, K., 24 Feb 2014, In : Chemistry - A European Journal. 20, 9, p. 2585-2596 12 p.

Tuning the luminescent properties of Pt(II) acetylide complexes through varying the electronic properties of N-heterocyclic carbene ligands

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Anticancer profile of a series of gold(III) (2-phenyl)pyridine complexes

Rubbiani, R., Zehnder, T. N., Mari, C., Blacque, O., Venkatesan, K. & Gasser, G., 2014, In : ChemMedChem. 9, 12, p. 2781-2790 10 p.

Impact of 2,6-connectivity in azulene: Optical properties and stimuli responsive behavior

Koch, M., Blacque, O. & Venkatesan, K., 28 Nov 2013, In : Journal of Materials Chemistry C. 1, 44, p. 7400-7408 9 p.

Highly efficient deep-blue emitters based on cis and trans N-heterocyclic carbene Pt-II acetylide complexes: Synthesis, photophysical properties, and mechanistic studies

Zhang, Y., Blacque, O. & Venkatesan, K., 11 Nov 2013, In : Chemistry - A European Journal. 19, 46, p. 15689-15701 13 p.

Stepwise construction of an iron-substituted rigid-rod molecular wire: targeting a tetraferro-tetracosadecayne

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beta-Iminoenamine-BF2 complexes: Aggregation-induced emission and pronounced effects of aliphatic rings on radiationless deactivation

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Trans Bis-N-heterocyclic carbene bis-acetylide palladium(II) complexes

Koch, M., Garg, J. A., Blacque, O. & Venkatesan, K., 1 Mar 2012, In : Journal of Organometallic Chemistry. 700, p. 154-159 6 p.

Dinuclear and mononuclear chromium acetylide complexes

Egler-Lucas, C., Blacque, O., Venkatesan, K., López-Hernández, A. & Berke, H., Mar 2012, In : European Journal of Inorganic Chemistry. 9, p. 1536-1545 10 p.

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Barman, S., Anand Garg, J., Blacque, O., Venkatesan, K. & Berke, H., 2012, In : Chemical Communications. 48, 90, p. 11127-11129 3 p.

Incorporation of active metal sites in MOFs via in situ generated ligand deficient metal-linker complexes

Barman, S., Furukawa, H., Blacque, O., Venkatesan, K., Yaghi, O. M., Jin, G. X. & Berke, H., 21 Nov 2011, In : Chemical Communications. 47, 43, p. 11882-11884 3 p.

Syntheses and photophysical properties of luminescent mono-cyclometalated gold(III) cis-dialkynyl complexes

Garg, J. A., Blacque, O. & Venkatesan, K., 20 Jun 2011, In : Inorganic Chemistry. 50, 12, p. 5430-5441 12 p.

Synthesis and luminescent properties of cis bis-N-heterocyclic carbene platinum(II) bis-arylacetylide complexes

Zhang, Y., Garg, J. A., Michelin, C., Fox, T., Blacque, O. & Venkatesan, K., 21 Feb 2011, In : Inorganic Chemistry. 50, 4, p. 1220-1228 9 p.

Stable and tunable phosphorescent neutral cyclometalated Au(III) diaryl complexes

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Cumulenyldiene and acetylide complexes accessed via stannylated acetylenes and butadiynes

Semenov, S. N., Blacque, O., Fox, T., Venkatesan, K. & Berke, H., 13 Dec 2010, In : Organometallics. 29, 23, p. 6321-6328 8 p.

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An iron-capped metal-organic polyyne: {[Fe](C≡C)₂[W]≡CC≡CC≡[W](C≡C)₂[Fe]}

Semenov, S. N., Taghipourian, S. F., Blacque, O., Fox, T., Venkatesan, K. & Berke, H., 9 Jun 2010, In : Journal of the American Chemical Society. 132, 22, p. 7584-7585 2 p.

Electronic communication in dinuclear C₄-bridged tungsten complexes

Semenov, S. N., Blacque, O., Fox, T., Venkatesan, K. & Berke, H., 10 Mar 2010, In : Journal of the American Chemical Society. 132, 9, p. 3115-3127 13 p.

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López-Hernández, A., Venkatesan, K., Schmalke, H. W. & Berke, H., Jul 2009, In : Monatshefte für Chemie. 140, 7, p. 845-857 13 p.

Synthesis and characterization of mononuclear and dinuclear manganese bis-acetylide complexes

Fritz, T., Schmalke, H. W., Blacque, O., Venkatesan, K. & Berke, H., Jul 2009, In : Zeitschrift für Anorganische und Allgemeine Chemie. 635, 9-10, p. 1391-1401 11 p.

Self-coupling of a 4-H-butatrienylidene tungsten complex

Semenov, S. N., Blacque, O., Fox, T., Venkatesan, K. & Berke, H., 29 Jun 2009, In : *Angewandte Chemie - International Edition*. 48, 28, p. 5203-5206 4 p.

Columnar mesophases from half-diskoid platinum cyclometalated metallomesogens

Venkatesan, K., Kouwer, P. H. J., Yagi, S., Müller, P. & Swager, T. M., 2008, In : *Journal of Materials Chemistry*. 18, 4, p. 400-407 8 p.

Organometallic manganese complexes as scaffolds for potential molecular wires

Venkatesan, K., Blacque, O. & Berke, H., 2007, In : *Dalton Transactions*. 11, p. 1091-1100 10 p.

Dark-field oxidative addition-based chemosensing: New bis-cyclometalated Pt(II) complexes and phosphorescent detection of cyanogen halides

Thomas, S. W., Venkatesan, K., Müller, P. & Swager, T. M., 27 Dec 2006, In : *Journal of the American Chemical Society*. 128, 51, p. 16641-16648 8 p.

Metallacumulenes as potential electron reservoir devices

Venkatesan, K., Blacque, O. & Berke, H., 23 Oct 2006, In : *Organometallics*. 25, 22, p. 5190-5200 11 p.

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New access to homodinuclear half-sandwich vinylidenemanganese complexes

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 μ -carbon - Carbon bonds of dinuclear manganese half-sandwich complexes as electron reservoirs

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Facile access to redox-active C₂-bridged complexes with half-sandwich manganese end groups

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Solvent stabilization and hydrogenation catalysis of trimethylphosphine- substituted carbonyl rhenium cations

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