

# CURRICULUM VITAE



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## PROFESSIONAL EXPERIENCE

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Since 2019	Associate Professor at the "Ecole Nationale Supérieure de Chimie de Rennes", UMR CNRS 6226 ISCR.
2015-2016	Half-time researcher at the "Université de Lorraine", UMR CNRS 7565 SRSMC.
2011-2019	Assistant Professor at the "Ecole Nationale Supérieure de Chimie de Rennes", UMR CNRS 6226 ISCR.
2010-2011	Postdoctoral fellow - Laboratory of Organic Chemistry (ETH Zürich). Direction: François Diederich.
2007-2010	PhD thesis at the "Laboratoire de Chimie Organo-Minérale". Supervision: Jean-Pierre Sauvage and Jean-Paul Collin (Strasbourg). Teaching at the University of Strasbourg.

## EDUCATIONAL BACKGROUND

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2019	Habilitation to lead research (HDR)
2007-2010	PhD thesis at the "Laboratoire de Chimie Organo-Minérale". Supervision: Jean-Pierre Sauvage and Jean-Paul Collin, Strasbourg (France).
2006-2007	Master 2 « Chimie Moléculaire et Supramoléculaire », University of Strasbourg.
2005-2006	Studies of chemistry at the Ecole Normale Supérieure, Cachan (France). Laureate of the "agrégation" in chemistry.
2003-2005	Studies of chemistry at the Ecole Normale Supérieure, Paris (France).

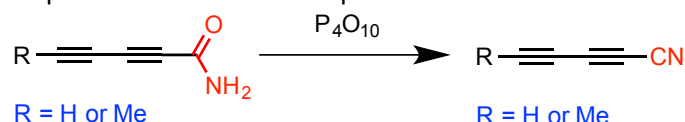
## CURRENT RESEARCH INTERESTS

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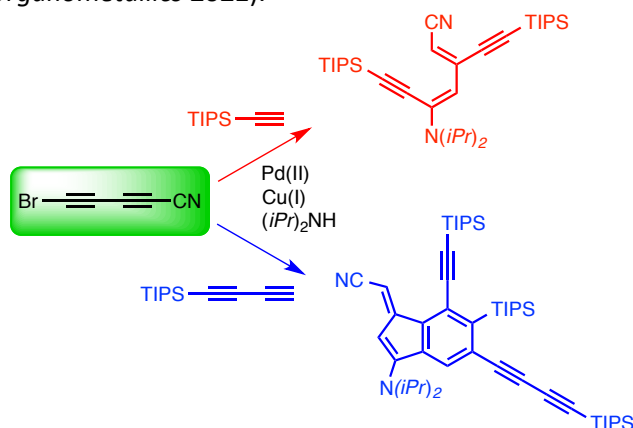
### 1) The interstellar organic chemistry

Following the idea that the main building blocks of life could have been brought on Earth from the interstellar medium (panspermy theory), we are willing to understand which kind of organic molecules are present in space, why, and what could be the relationship between them and prebiotically relevant compounds. In particular, we are interested in cyanopolynes ( $H-(C\equiv C)_n-CN$ ) and derivatives. We published new syntheses of cyanobutadiyne

(*Angew. Chem. Int. Ed.* **2005**) and methylcyanobutadiyne (*Chem. Eur. J.* **2013**, *J. Org. Chem.* **2016**). We also perform photolyses experiments in the gas phase in order to understand how these molecules could be formed in the interstellar medium, and experiments in condensed phase to examine their reactivity.

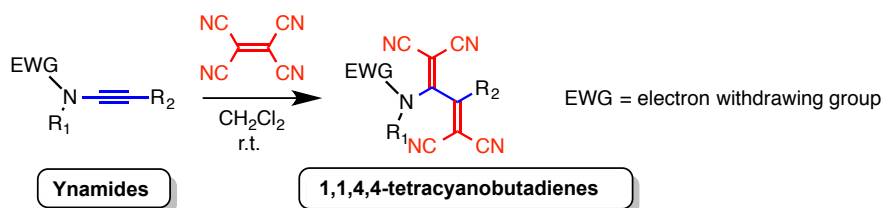


To synthesize the following members of this family, we synthesized the bromocyanobutadiyne (Br-C≡C-C≡C-CN) and reacted it with terminal acetylenes. Contrary to what was anticipated, the corresponding cyanopolynes were not obtained but other complex molecules were isolated, following an unprecedented mechanism (*Chem. Eur. J.* **2015**, *Helv. Chim. Acta* **2019**). Alkyne metathesis is now currently under investigation to generate conjugated triynes (*Chem. Science* **2020**, *Organometallics* **2021**).



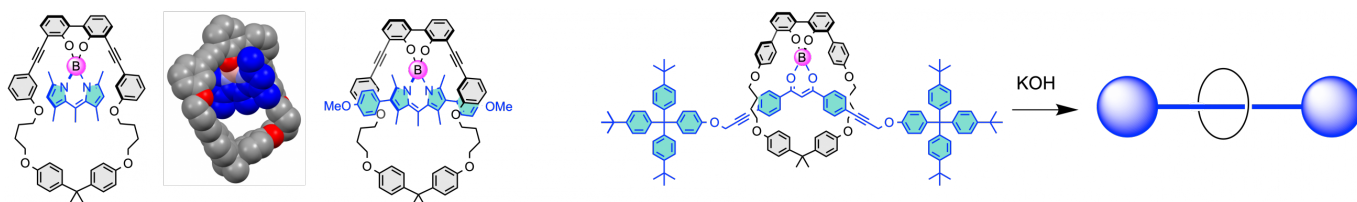
## 2) The synthesis and characterization of new 1,1,4,4-tetracyanobutadienes

We recently showed that a certain number of ynamides reacted very well with tetracyanoethylene to give 1,1,4,4-tetracyanobutadienes (TCBDs) in high yields, following a sequence of [2+2]cycloaddition-[2+2]retroelectrocyclization (*Chem. Eur. J.* **2014**; *Chem. Asian J.* **2017**). We are currently taking profit of the exceptional electron-withdrawing abilities of the TCBD group to tune the optoelectronic properties of some  $\pi$ -extended compounds (*Chem. Eur. J.* **2018**, *Chem. Comm.* **2020**, *Org. Lett.* **2021**, *Chem. Eur. J.* **2022**, *Tetrahedron Chem.* **2023**).



## 3) Synthesis and study of boron-assemblies

We recently demonstrated that it was possible to use boron to thread a linear molecule through a macrocycle (*Angew. Chem. Int. Ed.* **2024**; *ChemistryOpen* **2024**). When the thread is a BODIPY, the corresponding species are highly fluorescent with the macrocycle we used. It is also possible to thread a beta-diketonate, although in that case no fluorescence was observed. However, after adding two stoppers and removing boron, we isolated a rotaxane through this methodology.



## PUBLICATIONS

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- 49)** M. Hicguet, L. Verrieux, O. Mongin, T. Roisnel, F. Berrée, A. Fihey, B. Le Guennic, Y. Trolez, "Threading a Linear Molecule Through a Macrocyclic Boron: Optical Properties of the Threaded Species and Synthesis of a Rotaxane", *Angew. Chem. Int. Ed.* **2024**, 63, e202318297
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- 47)** L. Lemiègre, Y. Trolez, "A mechanistic study about the formation of tetracyanobutadienes revealed an autocatalytic behavior", *Asian J. Org. Chem.* **2023**, e202300321
- 46)** M. Roger, Y. Bretonnière, Y. Trolez, A. Vacher, I. Arbouch, J. Cornil, F. Gautier, J. De Winter, S. Richeter, S. Clément, P. Gerbier, *Int. J. Mol. Sci.* **2023**, 24, 8715
- 45)** A. Quelhas, T. Roisnel, J.-C. Guillemin, Y. Trolez, *Molbank* **2023**, 1, M1599
- 44)** C. Philippe, J. Melan, A. Barsella, T. Vives, Y. R. Leroux, F. Robin-Leguen, L. Lemiègre, D. Jacquemin, S. Gauthier, Y. Trolez, *Tetrahedron Chem* **2023**, 5, 100036
- 43)** C. Philippe, M. Coste, Y. Bretonnière, L. Lemiègre, S. Ulrich, Y. Trolez, « Quadruple Functionalization of a Tetraphenylethylene Aromatic Scaffold with Ynamides or Tetracyanobutadienes: Synthesis and Optical Properties », *Eur. J. Org. Chem.* **2022**, e202200049
- 42)** C. Philippe, A. T. Bui, M. Beau, H. Bloux, F. Riobé, O. Mongin, T. Roisnel, M. Cordier, F. Paul, L. Lemiègre, Y. Trolez, Synthesis and Photophysical Properties of 1,1,4,4-Tetracyanobutadienes Derived from Ynamides Bearing Fluorophores », *Chem. Eur. J.* **2022**, 28, e202200025
- 41)** A. Quelhas, H. Gazzeh, T. Roisnel, Y. Trolez, J.-C. Guillemin, "Passerini and Ugi reactions involving kinetically unstable isocyanides", *Eur. J. Org. Chem.* **2021**, 6002-6005
- 40)** N. Ripoche, M. Betou, C. Philippe, Y. Trolez, O. Mongin, M. Dudek, Z. Pokladek, K. Matczyszyn, M. Samoc, H. Sahnoune, J.-F. Halet, T. Roisnel, L. Toupet, M. Cordier, G. Moxey, M. G. Humphrey, F. Paul, "Two-photon absorption properties of multipolar triaryl-amino/tosylamido 1,1,4,4-tetracyanobutadienes", *Phys. Chem. Chem. Phys.* **2021**, 23, 22283-22297
- 39)** M. L. Zier, S. Colombel-Rouen, H. Ehrhorn, D. Bockfeld, Y. Trolez, M. Mauduit, M. Tamm, "Catalytic alkyne and diyne metathesis with mixed fluoroalkoxy-siloxy molybdenum alkylidyne complexes", *Organometallics* **2021**, 40, 2008-2015
- 38)** C. Philippe, A. T. Bui, S. Batsongo-Boulingui, Z. Pokladek, K. Matczyszyn, O. Mongin, L. Lemiègre, F. Paul, T. A. Hamlin, Y. Trolez, "1,1,4,4-Tetracyanobutadiene-functionalized anthracenes: regioselectivity of cycloadditions in the synthesis of small near-IR Dyes", *Org. Lett.* **2021**, 23, 2007-2012
- 37)** I. Curbet, S. Colombel-Rouen, R. Manguin, A. Clermont, A. Quelhas, D. S. Müller, T. Roisnel, O. Baslé, Y. Trolez, M. Mauduit, "Expedient Synthesis of Conjugated Triynes via Alkyne Metathesis", *Chem. Science* **2020**, 11, 4934-4938

- 36)** A. T. Bui, C. Philippe, M. Beau, N. Richy, M. Cordier, T. Roisnel, L. Lemiègre, O. Mongin, F. Paul, Y. Trolez, "Synthesis, characterization, and unusual near-infrared luminescence of 1,1,4,4-tetracyanobutadiene derivatives", *Chem. Comm.* **2020**, *56*, 3571-3574
- 35)** N. Kerisit, R. Ligny, E. S. Gauthier, J.-P. Guégan, L. Toupet, J.-C. Guillemin, Y. Trolez, "Synthesis and Reactivity of 5-Bromopenta-2,4-diyne nitrile (BrC<sub>5</sub>N): an Access to  $\pi$ -Conjugated Scaffolds", *Helv. Chim. Acta* **2019**, *102*, e-1800232
- 34)** Y. Trolez, "The Domino Hexadehydro-Diels-Alder Reaction: An Elegant Way toward Polyacenes, *Chem* **2018**, *4*, 2272-2274
- 33)** R. Bouvier, R. Durand, L. Favereau, M. Srebro-Hooper, V. Dorcet, T. Roisnel, N. Vanthuyne, Y. Vesga, J. Donnelly, F. Hernandez, J. Autschbach, Y. Trolez, J. Crassous, "Helicenes Grafted with 1,1,4,4-Tetracyanobutadiene Moieties:  $\pi$ -Helical Push–Pull Systems with Strong Electronic Circular Dichroism and Two-Photon Absorption", *Chem. Eur. J.* **2018**, *24*, 14484-14494
- 32)** Y. Trolez, A. D. Finke, F. Silvestri, F. Monti, B. Ventura, C. Boudon, J.-P. Gisselbrecht, W. B. Schweizer, J.-P. Sauvage, N. Armaroli, F. Diederich, "Unconventional Synthesis of a Cu(I)-Rotaxane With a Superacceptor Stopper: Ultrafast Excited-State Dynamics and Near-Infrared Luminescence", *Chem. Eur. J.* **2018**, *24*, 10422-10433
- 31)** T. Duchanois, L. Liu, M. Pastore, A. Monari, C. Cebrián, Y. Trolez, M. Darari, K. Magra, A. Francés-Monerris, E. Domenichini, M. Beley, X. Assfeld, S. Haacke, P. C. Gros, "NHC-Based Iron Sensitizers for DSSCs" *Inorganics* **2018**, *6*, 63
- 30)** S. Haberland, A. D. Finke, N. Kerisit, C. Katan, Y. Trolez, P. Gawel, I. Leito, M. Lokov, R. Järviste, K. Kaupmees, N. Trapp, L. Ruhlmann, C. Boudon, D. Himmel, F. Diederich, "Enhancement of Push–Pull Properties of Pentafulvene and Pentafulvalene Derivatives by Protonation at Carbon", *Eur. J. Org. Chem.* **2018**, 739-749
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- 28)** M. Betou, R. J. Durand, A. Sallustrau, C. Gousset, E. Le Coz, Y. R. Leroux, L. Toupet, E. Trzop, T. Roisnel, Y. Trolez, "Reactivity of Functionalized Ynamides with Tetracyanoethylene: Scope, Limitations and Optoelectronic Properties of the Adducts", *Chem. Asian J.* **2017**, *12*, 1338-1346
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- 26)** U. Szczepaniak, M. Turowski, T. Custer, M. Gronowski, N. Kerisit, Y. Trolez, R. Kołos, "Infrared and Raman spectroscopy of methylcyanodiacetylene (CH<sub>3</sub>C<sub>5</sub>N)", *ChemPhysChem* **2016**, *17*, 3047-3054
- 25)** Z. Pokladek, N. Ripoche, M. Betou, Y. Trolez, O. Mongin, J. Olesiak-Banska, K. Matczyszyn, M. Samoc, M. G. Humphrey, M. Blanchard-Desce, F. Paul, "Linear Optical and Third-Order Nonlinear Optical Properties of Some Fluorenyl- and Triarylamine-Containing Tetracyano-butadiene Derivatives", *Chem. Eur. J.* **2016**, *22*, 10155-10167
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- 23)** M. M. Montero-Campillo, O. Mó, M. Yáñez, A. Benidar, C. Rouxel, N. Kerisit, Y. Trolez, J.-C. Guillemin, "Gas Phase Infrared Spectroscopy of Substituted Cyanobutadiynes. The Role Played by Bromine Atom and Methyl Group as Substituents.", *ChemPhysChem* **2016**, *17*, 1018-1024
- 22)** M. Betou, A. Sallustrau, L. Toupet, Y. Trolez, "Synthesis of conjugated multi-ynamides by copper-catalyzed reaction", *Tetrahedron Lett.* **2015**, *56*, 4627-4630

- 21)** N. Kerisit, A. D. Finke, N. Trapp, Y. R. Leroux, J.-C. Guillemin, Y. Trolez, F. Diederich, "New reactivity of 6,6-bis-donor-substituted pentafulvenes: one-step synthesis of highly substituted [3]cumulene and dihydropentalene", *Tetrahedron* **2015**, *71*, 4393-4399
- 20)** N. Kerisit, L. Toupet, P. Larini, L. Perrin, J.-C. Guillemin, Y. Trolez, "Straightforward Synthesis of 5-Bromopenta-2,4-diyne nitrile and Its Reactivity Towards Terminal Alkynes: A Direct Access to Diene and Benzofulvene Scaffolds", *Chem. Eur. J.* **2015**, *21*, 6042-6047
- 19)** M. Betou, N. Kerisit, E. Meledje, Y. R. Leroux, C. Katan, J.-F. Halet, J.-C. Guillemin, Y. Trolez, "High-yield formation of substituted tetracyanobutadienes from reaction of ynamides with tetracyanoethylene", *Chem. Eur. J.* **2014**, *20*, 9553-9557
- 18)** V. Heitz, J.-P. Sauvage, Y. Trolez, "Cu(I)/Zn<sup>2+</sup> exchange has no geometrical effect in a cyclic [4]rotaxane whereas it induces rearrangement in a simpler [3]rotaxane", *Inorg. Chim. Acta* **2014**, *417*, 186-191
- 17)** S. Carles, Y. Trolez, J.-C. Guillemin, H. Mollendal, "Rotational spectrum of 4-methylcyanoallene (CH<sub>3</sub>CH=C=CH-CN), a chiral molecule of potential astrochemical interest", *Astronomy and Astrophysics* **2014**, *564*, A82
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- 13)** B. Ventura, L. Flamigni, J.-P. Collin, F. Durola, V. Heitz, F. Reviriego, J.-P. Sauvage, Y. Trolez, "NIR emission of cyclic [4]rotaxanes containing p-extended porphyrin chromophores", *Phys. Chem. Chem. Phys.* **2012**, *14*, 10589-10594
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