

1,1,4,4-tetracyanobutadienes derived from ynamides: new fluorophores sensitive to their environment

Yann Trolez¹

¹ Univ Rennes, Ecole Nationale Supérieure de Chimie de Rennes, CNRS, ISCR – UMR 6226, F-35000 Rennes, France
Email: yann.trolez@ensc-rennes.fr

Tetracyanoethylene (TCNE) is well known for reacting with some electron-rich alkynes to lead to 1,1,4,4-tetracyanobutadienes (TCBDs) in variable yields.^[1] This reaction processes according to a [2+2]cycloaddition-retroelectrocyclization sequence. In particular, we showed that ynamides are good partners to lead to TCBDs in high yields.^[2] Although TCBDs have long been considered as non-fluorescent compounds,^[3] we have recently shown that some TCBDs derived from ynamides are able to emit light, depending on their environment. In particular, they are very sensitive to the polarity of the solvent they are dissolved in.^[4] They are also able to emit light in near-infrared region in the solid state until 1550 nm if they are connected to a pyrene, a perylene or anthracenes (Figure 1).^[5]

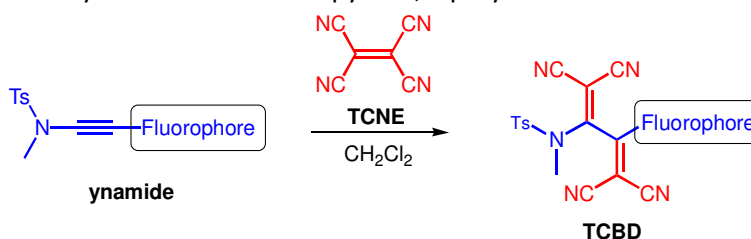


Figure 1. Synthesis of TCBDs connected to fluorophore from their corresponding ynamides.

References

- [1] a) T. Shoji, S. Ito, *Chem. Eur. J.* **2017**, *23*, 16696-16709; b) T. Michinobu, F. Diederich, *Angew. Chem. Int. Ed.* **2018**, *57*, 3552–3577.
- [2] a) M. Betou, N. Kerisit, E. Meledje, Y. R. Leroux, C. Katan, J.-F. Halet, J.-C. Guillemin, Y. Trolez, *Chem. Eur. J.* **2014**, *20*, 9553-9557; b) M. Betou, R. J. Durand, A. Sallustrau, C. Gousset, E. Le Coz, Y. R. Leroux, L. Toupet, E. Trzop, T. Roisnel, Y. Trolez, *Chem. Asian J.* **2017**, *12*, 1338-1346
- [3] F. Monti, A. Venturini, A. Nenov, F. Tancini, A. D. Finke, F. Diederich, N. Armaroli, *J. Phys. Chem. A* **2015**, *119*, 10677-10683
- [4] C. Philippe, A. T. Bui, H. Bloux, M. Beau, F. Riobé, O. Mongin, T. Roisnel, M. Cordier, F. Paul, L. Lemiègre, Y. Trolez, *manuscript in preparation*
- [5] a) A. T. Bui, C. Philippe, M. Beau, N. Richy, M. Cordier, T. Roisnel, L. Lemiègre, O. Mongin, F. Paul, Y. Trolez, *Chem. Commun.* **2020**, *56*, 3571-3574; b) C. Philippe, A. T. Bui, S. Batsongo-Boulingui, Z. Pokladek, K. Matczyszyn, O. Mongin, L. Lemiègre, F. Paul, T. A. Hamlin, Y. Trolez, *Org. Lett.* **2021**, *23*, 2007-2012

Acknowledgements

This work was supported by the Agence Nationale pour la Recherche (ANR JCJC Fluotet 17-CE07-0038-01) and the Région Bretagne.