

Master Internship 2019-2020

Luminescent supramolecular discotic hybrid liquid crystals

Contacts:

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The University of Stuttgart, IETR and ISCR research groups from Rennes are pursuing an ambitious, long term strategy aimed at replacing rare earth oxides currently used in the fields of energy conversion for lighting and optoelectronics by newly discovered phosphorescent hybrid materials. This is a unique opportunity to develop new materials and work with top-of-the-art equipment in a dynamic, interdisciplinary and international environment on the ANR PRCI "Snapster" project funded by the Agence Nationale de la Recherche and the Deutsche Forschungsgemeinschaft. This internship deals with the design, the synthesis and the studies of hybrid organic-inorganic materials showing liquid crystalline properties as well as luminescence. The objectives will be: i) to synthesize hybrid liquid crystals, ii) to study their liquid crystalline properties and iii) to explore their emission behaviour depending on time and temperature.

Candidates should have basic knowledge in organic, inorganic, and physical chemistry, as well as UV-Vis and emission spectroscopy. This internship will be the opportunity to get skilled in several technics such as: organic, inorganic and hybrid synthesis, differential scanning calorimetry, thermogravimetric analysis, polarized optical microscopy, small angle x-ray scattering, steady state and time resolved emission spectroscopy.

Candidates should be highly motivated and fluent in English. Knowledge of German is not mandatory but will be well appreciated as part of the internship will be realized in Stuttgart. Specific knowledge in liquid crystal chemistry and physics is less critical, however than outstanding intellectual ability, adaptability to different environments, curiosity and willingness to explore out-of-profil research fields.

The internship can also be performed in the frame of the double diploma ENSCR-Uni Stuttgart.

Publications:

1) Clustomesogens: Liquid Crystalline Hybrid Nanomaterials Containing Functional Metal Nanoclusters, Y. Molard, *Acc. Chem. Res.*, **2016**, 49, 8, 1514

2) Phosphorescent columnar hybrid material containing polyionic inorganic nanoclusters, S. K. Nayak, M. Amela-Cortes, M. M. Neidhardt, S. Beardsworth, J. Kirres, M. Mansueto, S. Cordier, S. Laschat, Y. Molard, *Chem. Commun.*, **2016**, 52, 3127

3) Lord of The Crowns: A New Precious in the Kingdom of Clustomesogens, K. Guy, P. Ehni, S. Paofai, R. Forschner, C. Roiland, M. Amela-Cortes, S. Cordier, S. Laschat, Y. Molard, *Angew. Chem. Int. Ed.* **2018**, 57, 11692

4) Luminescent liquid crystalline hybrid materials by embedding octahedral molybdenum cluster anions with soft organic shells derived from tribenzo[18]crown-6, P. Ehni, K. Guy, M. Ebert, S. Beardsworth, K. Bader, R. Forschner, A. Bühlmeyer, N. Dumait, C. Roiland, Y. Molard and S. Laschat, *Dalton Trans*, **2018**, 47, 14340