10th International Conference on Molecular Electronics
November 29 - December 2, 2021

Redox-controlled hybridization of electroactive foldamers

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Abstract:

Since 2000, foldamers have attracted the attention of chemists all over the world.[1] Mostly inspired by biomacromolecules, foldamers constitute a family of artificial oligomers that adopt well-defined conformations, which are stabilized by non-covalent interactions. These structures find numerous applications related to biology, molecular recognition,[2] catalysis,[3] or more recently, stimuli responsive materials.[4] Among the diversity of foldamer backbones few skeletons hybridize to form multiple helices.[5] The corresponding dynamics proved to be affected by parameters, such as temperature, concentration and solvent.[6] However, controlling this equilibrium in a reversible manner remained largely unexplored until recently. In this context, we currently explore the possibility to tune the hybridization abilities of foldamers through redox stimulations. This challenge was first tackled with tetrathiafulvalene-based foldamers endowed with five-pyridyl rings.[7] Now, our efforts are dedicated to the generalization of this strategy with longer oligomers and more importantly, on the extension of this concept to double helices made up of two complementary strands and called heteroduplexes.

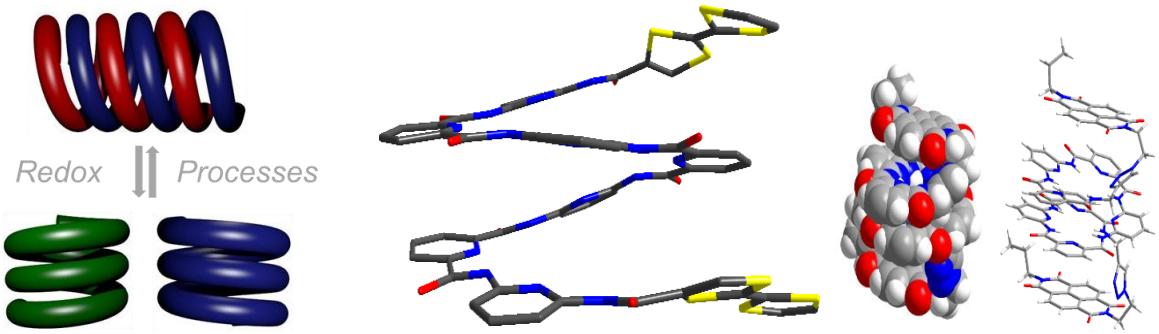

Figure 1. *left. Schematic representation of the redox-controlled hybridization of foldamers. Center. X-Ray crystal structure of a TTF-based oligopyridine dicarboxamide foldamer. Right. X-Ray crystal structure of a NDI-based oligopyridine dicarboxamide foldamer.*

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