

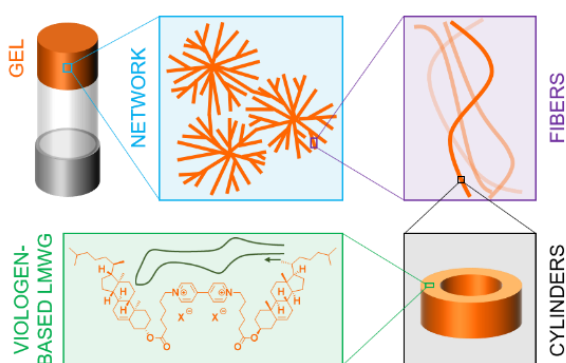
Photoredox Control of Electron-responsive and Conductive Supramolecular Materials Based on Viologens

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The key elements in the development of nanoscience are to observe, modify and control matter at the nanoscale. One strategy proposed to meet these immense challenges is to develop responsive molecular or supramolecular systems for which a structural reorganization is obtained in response to an external stimulation. By analogy to the term used in geology, such a behavior is known as *metamorphism*. Systems that endure structural changes leading to major modification of macroscopic properties are of great interest for the controlled capture and release of guest molecules, the development of molecular machines and molecular electronics. Our research efforts in this field have led us to focus on molecular and supramolecular architectures involving viologens (4,4'-bipyridinium salts) as key electron-responsive building elements.¹ In particular, we have developed different strategies allowing to exploit the ability of viologen derivatives to form π -dimers in their reduced state to achieve a remote control over their organization within supramolecular assemblies. Among our recent achievements, we have reported a sol/gel transition triggered by light-irradiation of a viologen-based coordination polymer formed in the presence of palladium ions.²



We now report supramolecular gels obtained by self-assembly of a dicationic low molecular weight gelator based on viologen. These molecules have been shown to self-assemble in pentanol to form chiral hollow core-shell cylinders eventually yielding dendritic clusters inducing gelation. We also showed that the optical, rheological and electrical properties of the gels can be tuned by addition of ionic additives. Careful control of the formation of charge-transfer complexes between viologens and iodides have led to a robust, transparent, conductive and chiral gel.³ Properties of this responsive material can be modulated when submitting it to electrical or light stimulation.

Acknowledgements

The authors thank the Ecole Normale Supérieure de Lyon (ENSL) and the Centre National de la Recherche Scientifique (CNRS) for financial, logistical, and administrative supports. The authors thank the ESRF for beamtime at the beamline ID02 and Theyencheri Narayanan for discussions and technical support for the USAXS measurements. This work was supported by the LABEX iMUST (ANR-10-LABX-0064) of Université de Lyon within the program "Investissements d'Avenir" (ANR-11-IDEX-0007) operated by the French National Research Agency (ANR), by the ANR ANGEL (ANR-21-CE06-0020) and by the "Mission pour les initiatives transverses et interdisciplinaires" MITI CNRS (Auto-organisation AAP). Participation this conference was supported by *Ambition Internationale* (Auvergne Rhône-Alpes).

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