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LECTURE

"Engineering of Redox Triazole-based Nanomaterials"

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Wednesday, April 4, 2018, 12:00

Seminar room, ground floor, NHRF

Engineering of Redox Triazole-based Nanomaterials

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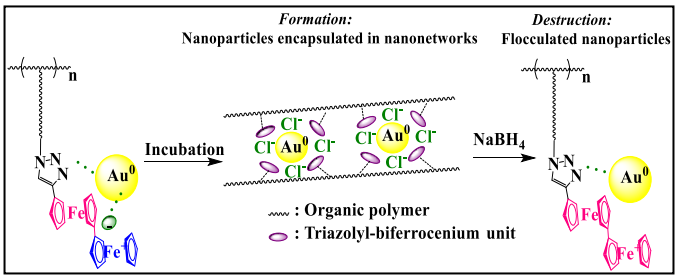
In the last decade strong interest is focused on the interface of redox-macromolecules and solids. The supramolecular interactions between redox macromolecular materials with surfaces, nanoparticles and electrodes, lead to creation of unique, flexible and at the same time controlled nanoarchitectures[1]. The recently discovered CuAAC (copper catalyzed azide-alkyne cycloaddition) represents a powerful alternative for the connection of redox-active moieties on macromolecules[2]. Triazole rings compared with all-carbon rings confer to these systems extra possibilities to act as ligands for metals's coordination, metal nanoparticles' stabilization and as hydrogen bond acceptors or/and donors.

Dendrimers and polymers decorated with transition-metals such as iron, cobalt and rhodium complexes in the periphery through triazole linkages represent a step forward in terms of redox sensing in organic or even aqueous media, fabrication of modified-electrodes and design of novel nanoarchitectures[2]. For example electron[3] or hydride reduction[4] of Au^{III}, Ag^{I} or Pd^{II} by redox macromolecules lead to specific and well-defined architectures such as nanonetworks or micellized robust capsules, respectively, both encapsulating metal nanoparticles at the interior. How both electrostatic interactions and triazole linkages are responsible for the bottom-up formation of these nanostructures will be also described in my talk (ISM, Bordeaux, France).



Last, the design of 2D-triazolyl template nanomaterials is envisaged and described, which would be the next step towards a more controlled and ordered encapsulation of metal nanoparticles offering advantageous potentials in sensing, catalysis or molecular electronics (University of Tokyo).

References

1) a) Brust, M. *Angew. Chem. Int. Ed.* **2006**, *45*, 4399–4401, b) Lopes, W. A.; Jaeger, H. M. *Nature* **2001**, 414, 735-738.
2) (a) *Acc. Chem. Res.* **2012**, *45*, 630-640, (b) *Inorg. Chem.* **2013**, *52*, 6685-6693, (c) Inorg. Chem. **2015**, 54, 2284–2299.
3) (a) *J. Am. Chem. Soc.* **2014**, *136*, 13995–13998, (b) *Angew. Chem., Int. Ed.* **2014**, *53*, 8445–8449.
4) Chem. Comm. **2017**, 53, 6267-6270.
5) Chem. Eur. J. **2017**, 23, 8443–8449.