

Prof. Alexander Kirillov (University of Lisbon-IST, PT)

kirillov@tecnico.ulisboa.pt

<http://orcid.org/0000-0002-2052-5280>

Title of the lecture:

Functional Coordination Polymers: from Self-Assembly in Water to Applications

Keywords: Metal-Organic Frameworks, Hydrothermal Synthesis, Crystal Structures, Copper, Silver, Catalysis, Hydrocarbon Oxidation, Antimicrobial Materials

Abstract. This lecture will highlight our recent research on the self-assembly synthesis and applications of a wide diversity of functional metal-organic architectures, including coordination polymers (CPs), metal-organic frameworks (MOFs), and multinuclear metal complexes. The following main topics will be discussed. (1) Aqueous medium self-assembly generation and structural diversity of copper(II) CPs driven by aminoalcoholate and carboxylate ligands. Application of these compounds as efficient catalysts in mild oxidative functionalization of alkanes and other substrates. (2) Crystal engineering of MOFs & CPs assembled from multifunctional polycarboxylic acids with biphenyl or phenyl-pyridine cores and various metal nodes (Fe, Co, Cu, Zn, Ln). Examples of their applications as heterogeneous catalysts, selective adsorbents, or luminescent probes. (3) Design of bioactive Ag and Cu-based coordination polymers toward applications as topical antimicrobial agents. Fabrication of CP-doped biopolymer films based on soybean oil, potato starch, agarose or cellulose with potent antibacterial and biofilm inhibition activity.