MOLECULAR MATERIALS BASED ON ORGANOMETALLIC COMPOUNDS

João Rodrigues, João Figueira, Manuel Jardim, Swarup Maiti*
Centro de Química da Madeira, LQCMM/MMRG, Departamento de Química da Universidade da Madeira, Campus da Penteada, 9000-390 Funchal, PORTUGAL
joaor@uma.pt

In the promising field of molecular electronics[1], polynuclear compounds featuring redox-active organometallic end groups seem especially attractive from various perspectives, in particular for information storage and processing.[2]

The ongoing research at the Molecular Materials Research Group (MMRG), in the field of metallodendrimers and molecular wires, developed in collaboration with other international groups, takes advantage of the use of well known synthetic methodologies for the synthesis of new organic spacers and of the use of transition metal complexes fragments.

Particularly we explore the properties of the nitrile ligand, an isoelectronic group of acetylide, as well as of the acetylide for the preparation of novel metallodendrimers and molecular wires with improved electronic and non linear optical properties.[3]

The prepared metallodendrimers were based on ruthenium and iron complexes having, as organic core, the 1,3,5-tris(4-ethynylbenzonitrile)benzene (an acceptor with an extended π-system and octopolar symmetry), or nitrile-functionalized poly (alkylidene imines) (Fig.1).

Conventional research in the field of molecular wires is focused on the synthesis of π-conjugated oligomers and polymers[4], but these π-systems still suffer from limitations related to the type of elements and molecular motifs that can be incorporated into the wires. In this field, we have under study different organic spacers (*e. g.* 1,4-diethenylbenzene derivatives) as well as metal complexes in view of the preparation of molecular wires with enhanced electronic properties (Fig. 2).

An overview of the most outstanding results will be presented and discussed envisaging the potential application of the novel compounds as nanoelectronic materials.

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[4] For some recent books on the field, see for example: (a) "*Springer Handbook of Nanotechnology*", Edited by Bhushan, B. Springer-Verlag, Berlin, Heidelberg, 2004. (b) "*Molecular Electronics: Commercial Insights, Chemistry, Devices, Architecture and Programming*", Edited by Tour, J. M. World Scientific Publishing, New Jersey, 2003.

Figure 1:

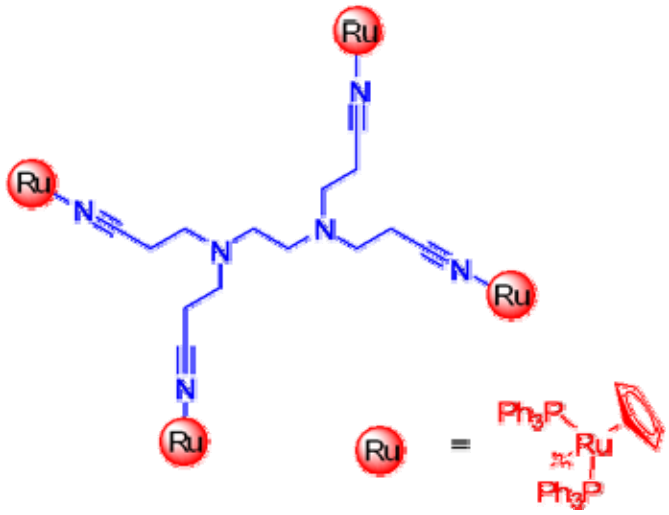

Figure 2: