Metals based on neutral molecular species; the new paradigm and its application to plastic electronics

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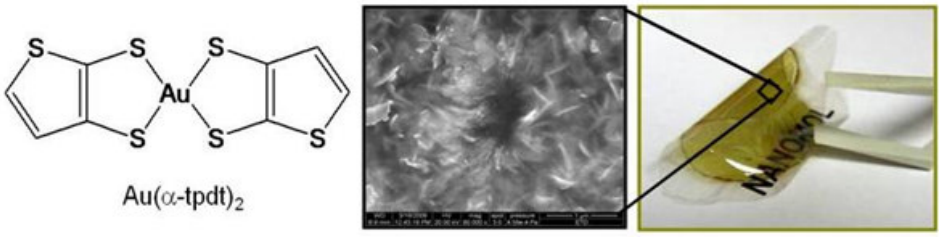
Thanks to continuous and significant reserch efforts during the last decades that a large number of molecule based compounds with electrically conducting properties of metals or even of superconductors are presently known. Until recently all these these molecular conductors were charge transfer salts based on the partial electronic transfer from electronic donor or acceptor molecular species. The metallic properties in these compounds are therefore associated with the formation of partially filled bands of extended networks of electroactive species, upon electronic transfer towards suitable counter ions. However a new paradigm of molecular metals, based on neutral species, emerged during the last decade. In these systems the partially bands associated with the metallic properties are achieved by band overlapping as in elemental semimetals.

In in the first part of this presentation it will be reviewed the contribution of our group to the preparation of what are the still rare examples of metallic systems based on neutral molecules, starting with [Au(α-tpdt)$_2$], the first of such examples[1, 2]. In the last part of the presentation a strategy for the application of these compounds in the preparation of conducting bilayer films suitable for applications in plastic electronics [3] will be described.



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Acknowledgements: Work partially supported by FCT under contract PTDC/QEQ-SUP/1413/2012.