Chemical, electrical, and thermal characterization of metal-organic coordination polymer multilayers produced by sequential in situ self-assembly.

Vasiliki Benekou[1], Zhe Zhang[2], Lukas Sporrer[2], Andrea Candini[1], Alessandro Kovtun[1], Stefan Mannsfeld[2], Xinliang Feng[2], Renhao Dong[2], Vincenzo Palermo[1]

[1] *Institute of Organic Synthesis and Photoreactivity, National Research Council of Italy, Via Gobetti 101, Bologna, Italy,* [2] *Center for Advancing Electronics Dresden (cfaed) & Faculty of Chemistry and Food Chemistry, Technische Universität Dresden, 01062 Dresden, Germany*

vasiliki.benekou@isof.cnr.it

Graphene, being the pioneer, has initiated the discovery of new classes of 2D materials with promising chemical and physical properties. Among those materials are the coordination polymers [1] which exhibit intrinsic porosity, thermal stability, and electrical conductivity and therefore are considered suitable candidates for numerous applications.

In this work, we studied different configurations of metal-organic coordination polymer thin films prepared by Shear coating technique (Fig. 1), a fast and versatile synthesis technique that allows the preparation of many different film configurations. Scanning Probe Microscopy (SPM) techniques were utilized to characterize the electrical properties of these films. More specifically, we employed Kelvin probe force microscopy (KPFM), a technique used for measuring the work function of materials under different experimental conditions [2]. In our study, KPFM is used to monitor the changes in the work function of the films with respect to the main metallic element and reaction time (Fig.2). In addition, the conductivity and thermal stability of these films have been investigated via conductive AFM and XPS spectroscopy respectively.

Our work suggests the exciting possibility to tune the electrical properties of the studied films not only by the synthesis but also by using different stacking configurations.

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References

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Figures

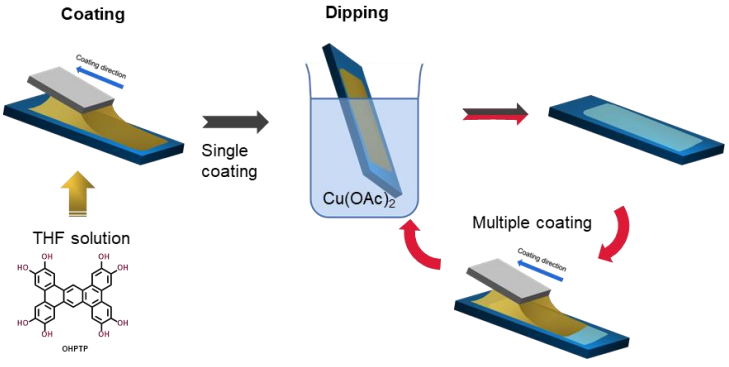

Figure 1: Shear coating technique

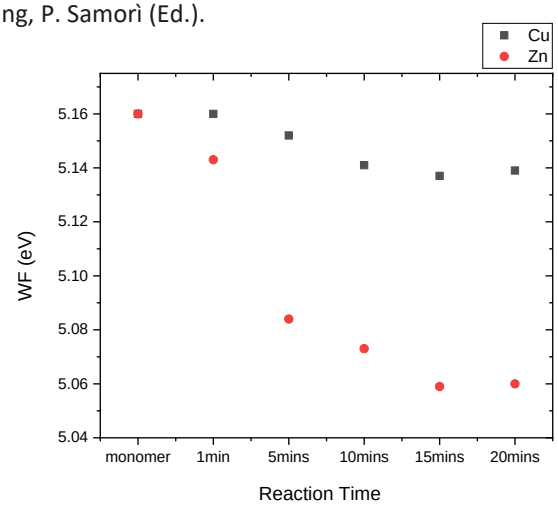

Figure 2: Summary graph of the work function dependence on reaction time.