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EXTENDED EDITION

Composite materials approach for optoelectronic chromogenics

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Printed graphics is emerging to the age of interactivity with innovative advanced materials sets allowing the design of smart objects and environments. Electrochromics enables mass producible ultra-low-power interactive displays to create the so-called "Internet-of-Things" (IoT). Further development requires various skills, including the two topics in which I am involved: i) better electrochromic materials and ii) reliable alternatives of ITO for electrodes. In both cases there are specific challenges, such as using health-friendly approaches (e.g., "green" solvents) and achieving a variety of colors that may be scaled-up rather easily. Examples to tackle those topics will be shown, focusing on chemically designed semiconductor polythiophene interactions with inorganic nanomaterials. Indeed, nanoporous TiO₂ and carbon nanomaterials (MWCNTs and graphene) give rise to improved devices in terms of durability and switching times. The interest in this technology gave rise to a strong international collaboration between Academia and Industry under the scope of two recent H2020 Projects which I am going to present: INFUSION (H2020-MSCA-RISE-2016, Number 734834) and DecoChrom (H2020-NMBP-2017-two-stage, Number 760973). In particular, DecoChrom brings together a strong interdisciplinary consortium in 9 different countries, industry and research balanced, with the ambition of providing toolkits to designers and the printing industry.

César A.T. Laia is Assistant Researcher at FCT NOVA since 2006, with a PhD in Chemistry at Universidade Técnica de Lisboa (1999). His research activity focuses in the development of optically active materials, including electrochromic devices and photoluminescent glasses, using chemical bottom-up approaches towards nano- or self-assembled materials with enhanced properties for applications in displays, lightning or light-harvesting. He is currently PI of a Portuguese national project for the development of photoluminescent glass and local PI of a H2020 project (DecoChrom) on electrochromic devices. He has 55 publications in peer-reviewed scientific journals and 4 patents.

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ISOF 12 – Meeting Room (1st floor)

CNR Research Area

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