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CV/ biography

David Muñoz-Rojas received his degree in Organic Chemistry at the Instituto Químico de Sarrià (IQS, 1999) and his PhD in Materials Science (2004) at the Instituto de Ciencia de Materiales de Barcelona. Thereafter, he worked as a postdoc at the Laboratoire de Réactivité et Chimie des Solides in Amiens, the Research Centre for Nanoscience and Nanotechnology in Barcelona and at the University of Cambridge. He is currently a CNRS researcher at Laboratoire des Matériaux et du Génie Physique in Grenoble. His research focuses on using and developing cheap and scalable chemical approaches for the fabrication of novel functional materials for electronic and optoelectronic applications. In particular, he has pioneered the development of the novel SALD technique for the deposition of active components for optoelectronic devices. He is currently developing SALD further to extend the possibilities and fields of application of this exciting technique through several ANRs (one as coordinator), regional and local projects, and a FET Open project that he coordinates. He (co)authored 78 publications, 6 book chapters, coedited a book and is (co)inventor of 6 patents.

SPATIAL ATOMIC LAYER DEPOSITION: A HIGH-THROUGHOPUT, OPEN-AIR TECHNIQUE ALLOWING THE DEPOSITION OF PATTTERNED FUNCTIONAL MATERIALS

Within the materials deposition techniques, Spatial Atomic Layer Deposition (SALD) is gaining momentum since it is a high throughput and low-cost alternative to conventional ALD. SALD relies on a physical separation (rather than temporal separation, as is the case in conventional ALD) of gas-diluted reactants over the surface of the substrate by a region containing an inert gas.[1] Thus, fluid dynamics play a role in SALD since precursor intermixing must be avoided in order to have surface-limited reactions leading to ALD growth, as opposed to CVD growth. Fluid dynamics in SALD mainly depend on the geometry of the reactor and its components.
While care is normally taken to prevent precursor crosstalk when using SALD, we have shown that the spatial separation principle can also be applied to perform CVD reactions (SCVD), i.e. growth not limited to the surface, yielding yet faster deposition rates while maintain the film quality and conformality typical of ALD and SALD. [2,3] We have also shown that selective deposition can be achieved by working in SCVD mode. In this new approach to area-selective deposition (ASD), the depositions are performed in static mode (i.e. no relative movement between the reactor and the substrate), and Computational Fluid Dynamics (CFD) simulations are used to control de effect of the differnt deosition parameters on the SCVD mode. [4]
In this presentation we will show how close-proximity SALD based on a manifold injection head working in the open air can be tuned to deposit custom patterns without the need of pre-patterning steps. This is achieved by using the system in static SCVD mode and by a proper design of the injection head using 3D printing. We will also show other new approaches to ASD developed with our SALD system and how it can be tuned to perform 3D printing of functional materials

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