Functional self-assembled molecular monolayers for electrochemical devices

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The surface modification of solid inorganic supports with chemically bonded self-assembled monolayers (SAMs) has been proved to be a promising and versatile route for the development of smart surfaces that are able to respond to an external stimulus. In this context, SAMs of electroactive molecules on conductive surfaces offer the opportunity to tune the surface properties by the application of an electrical signal. Alternatively, SAMs with receptor groups that can interact with target analytes promoting an electrical response are also highly appealing for sensing purposes. Here, we will show our work on the preparation of SAMs to be exploited as molecular switches with different electrical, optical or chemical outputs. [1-2] Additionally, some of these SAMs have been exploited for more advanced devices such as for water actuation, of high interest in the field of digital microfluidics (Fig.1).[3] Finally, SAMs have also been implemented into electrolyte-gated organic field-effect transistors (EGOFETs) for both the fabrication of memories and sensing devices.[4-5]

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FIGURES

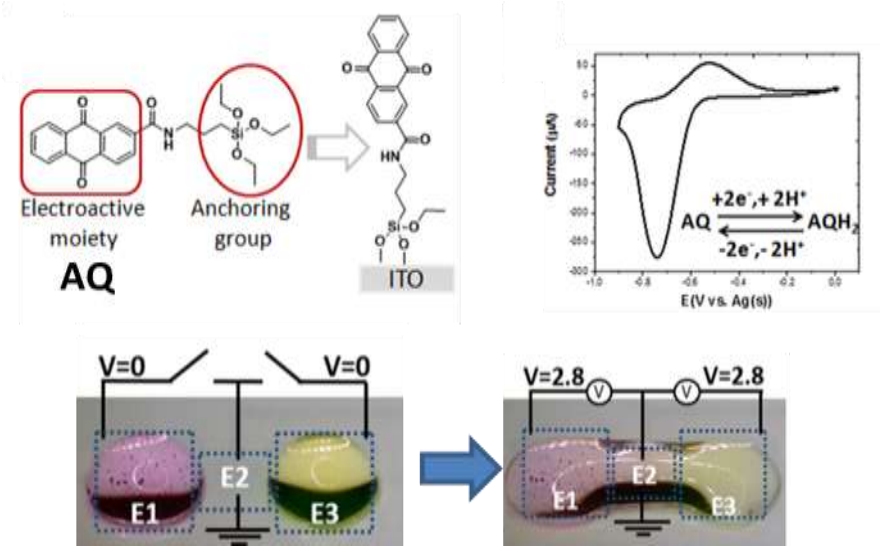

Figure 1: Top: Self-assembled monolayer (SAM) of an anthraquinone (AQ) derivative on indium tin oxide (ITO) with its corresponding cyclic voltammetry showing its redox character. Bottom: Snapshots of the water actuation performed with these SAMs (droplet merging).