Study and characterization of modified silicon surfaces with organic molecules

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Type: Poster
Theme: E. Materials, Devices and Nanochemistry
Topic: E2. Nanomaterials, Devices, Technology and applications
Keywords: Benzazepines, Tripod-shaped molecules, Silicon surfaces, Nanostructuration, Functionalization

SUMMARY:

Nanostructured thin films and subsequent biofunctionalization of silicon substrates are essential for the development of biosensors devices. The formation of organic monolayers on silicon substrates via Si-C bound allows specific interactions with biomolecules and presents several advantages like greater detection sensitivity and stability against hydrolytic cleavage.[1]

In this sense, to control the orientation and spacing between grafted functional moieties on the surface, tripodal oligo (*p*-phenylene)s have become ideal anisotropic adsorbates due to their shape-persistent and selfstanding characteristics.[2]

On the other hand, biomolecules such as tehtahydro[3]benzazepines are well-known to contain in their structure a phenetylamine skeleton, which is also present in dopaminergic receptors and drugs, therefore these molecules have a remarkable interest in medicinal chemistry.

Here we report the synthesis and characterization of several tetrahydro[3]benzazepines and tripod-shaped oligo(*p*-phenylene)s which were suitably functionalized for its subsequent adsorption on silicon surfaces by hydrosilylation and/or CuAAc click reaction. X-ray photoemission spectroscopy (XPS) and atomic force microscopy (AFM) analysis were also carried out to reveal the presence of the grafted molecules on the different Si surfaces.

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[2] Sánchez-Molina, M.; López-Romero, J.M.; Hierrezuelo-León, J.; Martín-Rufián, M.; Díaz, A.; Valpuesta, M.; Contreras-Cáceres, R. *Asian J. Org. Chem*. DOI: 10.1002/ajoc.201500526.