TRIPOD-SHAPED PENTA (P-PHENYLENE)S FOR THE FUNCTIONALIZATION OF SILICON SURFACES

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In order to obtain nanostructured thin films to be used in biosensor devices, several chemical functionalization methods have been developed, such as Click chemistry or Suzuki carbon-carbon coupling reactions on surfaces.¹

With the aim to control the orientation and spacing between grafted functional groups on a surface, tripodal oligo (*p*-phenylene)s have become the ideal anisotropic adsorbates due to their shape-persistent and self-standing characteristics.²

Here we report the synthesis and characterization of several tripod-shaped oligo(p-phenylene)s molecules with legs composed of five phenylene units, compounds 1, 2 and 3. In these structures, each leg is end-capped with an NH-Boc, NH_2 and N_3 group, respectively. The functional arm contains an acetylene group. The presented synthesis has as key step the Pd-catalyzed Suzuki cross-coupling reaction. In particular, a iodine derivative from the silicon core molecule reacts with the appropriate tetra(p-phenylene) boron derivative, thus generating the final tripod-shaped structure. The azide end-capped leg in 3 is specifically designed for its covalent incorporation on alkynyl terminated silicon surfaces by an easy and reproducible way. As a preliminary study, we present the alkynyl-functionalized silicon wafers nanostructuration with tripod 3 through the cooper catalyzed alkyne-azide cycloaddition (CuAAC) click reaction.

[1] Wong, L. S.; Khan, F.; Micklefield, J. Chem. Rev., 2009, 109, 4025-4053.

[2] López-Tocón, I.; Peláez, D.; Soto, J.; Rico, R.; Cai, C., López-Romero, J. M.; Otero, J. C., *J. Phys. Chem. B* **2008**, 112, 5363-5367