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Molecular nanoarchitectures from on-surface reactions and assembly

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One of the goals of nanoscience is achieving precise control over the structure and function of nanoscale architectures at surfaces. Bottom-up approaches using molecular building blocks present a flexible and intuitive approach to this challenge. Combining the Lego-like modularity of molecules with the epitaxial and reactive influences of surfaces creates a range of opportunities to build exciting new nanoarchitectures.
Reacting molecules on a surface can allow for the fabrication of extended covalent nanostructures with enforced planarity. I will discuss our recent work in studying C-C coupling reactions of halogenated and carboxylated molecules at metal surfaces, where we have been focussing on understanding the effect of heteroatoms in the reaction process and the subsequent formation of oligomeric and polymeric structures, using a combination of scanning tunnelling microscopy, photoelectron spectroscopy and near-edge x-ray absorption fine structure to gain a well-rounded insight into the process.

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