On-Surface Synthesis with Hydrogen Atoms

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In recent years the on-surface manipulation and chemical reactions created a playground for atomically precise synthesis and development of new atomic and molecular nanostructures. However, the abilities to produce desired systems are limited, among others, by relying on the catalytic role of the substrate in initiating selected reactions. Therefore striving for the generation of desired systems forces the search of new reaction pathways and catalytic transformations.

In this talk I will demonstrate our approach based on the application of hydrogen atoms in the on-surface experiments the application of atomic hydrogen in on-surface transformations of organometallic hybrids [1] and graphene nanoribbons [2]. The potential of atomic hydrogen will be highlighted e.g. by the ability of the reaction byproducts removal, the organometallic phases quenching or heteroatomic substitution. Subsequently the focus will be shifted toward non-metallic substrates.

While the surface assisted synthesis approach has proven its effectiveness in the precise formation of new organic compounds on metallic surfaces one of the most challenging limitations arises from the deep dependence on the catalytic activity of the substrate. This makes the direct transfer to the technologically desired non-metallic surfaces extremely challenging. In this talk I will present our pathway for the synthesis of new molecular compounds on non-metallic surfaces [3-6] with prospects for circumventing the need to exploit the catalytic role of metallic substrates [7].

Reference

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