

Covalent coupling on surfaces in UHV

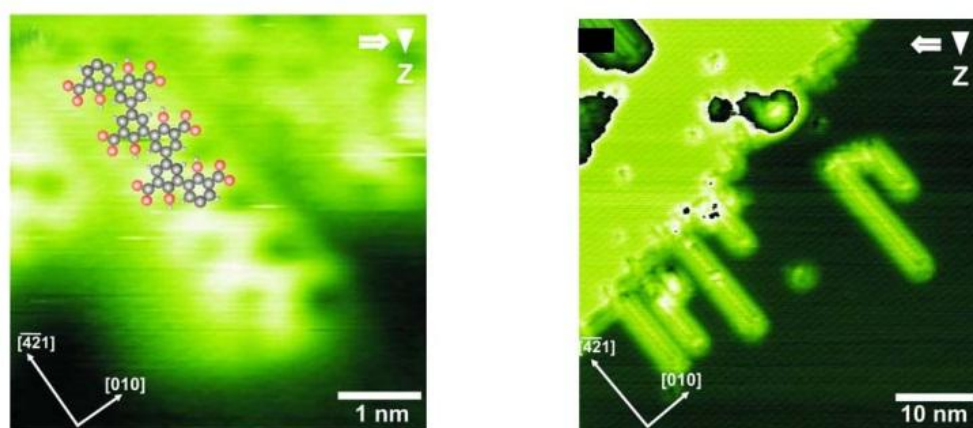
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Abstract

On-surface covalent coupling of organic precursors to form 0D, 1D, or 2D stable molecules has revealed in the past five years as a potentially powerful way of synthesizing molecular devices difficult or impossible to prepare in solution. So far, this technique has mainly been limited to metallic surfaces or 1ML insulating films on metal, and has allowed for instance to obtain 1D and 2D porphyrin oligomers, nanographene ribbons, polymeric Fe-phthalocyanine single layers and so on.^{1,2} Taking into account the recent results in this field, it is now possible to propose coupling mechanisms, and to discuss the potential and limitations of this strategy. For molecular electronics or molecular optics applications, extension of this on-surface coupling technique is also a major objective. We³ have recently demonstrated^{4,5} that, by employing the strong electrostatic interactions between the carboxylate groups of halide-substituted benzoic acids and calcite surfaces, it was possible to reach homolytic cleavage temperatures. This allows for the formation of aryl radicals and intermolecular coupling. By varying the number and position of halide groups, we have obtained linear or zig-zag oligomers.



Oligomers obtained by coupling of 3,5-diiodosalicylic acid (left) and 2,5-diiodobenzoic acid on calcite

References:

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