On-surface synthesis and post-synthetic modification of low-dimensional organometallic networks

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The rise of low-dimensional systems with extraordinary electronic and mechanical properties such as graphene, graphyne and graphdiyne has strongly spurred the scientific research on novel organic materials supported on surfaces. In this talk, the on-surface synthesis of organometallic networks (OMNs) on a model metal surface, the Ag(111) surface, is presented. By exploiting interfacial coupling reactions of suitable molecular precursors and metal adatoms picked up from the substrate, OMNs with very high order and mesoscopic regularity can be obtained, which feature a single sheet of Ag-metalated graphdiyne. The combination of mixed sp^2 - *sp* hybridization and metal centres with Kagome ordering leads to the prediction for the resulting single-layer OMN of an intriguing, unconventional electronic structure, which – however – may be strongly modified by the presence of the underlying support. We also show that further tailoring of the OMN chemical and geometric structure can in principle be achieved by exchanging the metal centres via transmetalation strategies. Current stand and future challenges of the presented work are discussed.