# Tuning the reactivity of diamond surfaces

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The reactivity of diamond surfaces, on bulk and nanoparticles alike, strongly depends on the actual surface termination and the arrangement of surface atoms. Whereas hydrogen terminated diamond is only accessible via rather harsh reaction conditions such as photochemical alkylation the reactivity of diamond with oxygen termination or a reconstructed surface is significantly increased. Reconstruction of the diamond surface e.g. by thermal annealing or electron irradiation leads to the removal of surface groups and the formation of graphene-like, curved structures made of $sp^2$ carbon.[1]

Here, we discuss the structure and chemistry of such surfaces and their reactivity in C-C bond forming reactions.[2,3] Reactions like arylation using diazonium salts, Diels-Alder, Bingel-Hirsch and Prato reaction on the fullerene-like surface structures can be successfully applied for the controlled surface modification of nanodiamond and the grafting of complex functional moieties.[4] This leads to functional nanodiamond materials that can be applied in many areas such as drug delivery, functional coatings, quantum engineering, labelling and sensing.

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