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Abstract

Surface Modification of Diamond for Sensor Applications †

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Diamond is a very interesting material for sensor applications: it has a high bio-compatibility which makes it interesting for in-vivo applications and in the form of boron-doped diamond it is a p-type semiconductor which makes diamond potentially useful in electrochemical sensor applications.

Even so diamond can be synthesized with relative ease as bulk material or in the form of (structured) films (CVD-diamond), it is not as common as e.g., gold in sensor applications. This may in part be due to the impression, that diamond is not easily modified with hapten or detection molecules. In reality the surface chemistry of diamond is versatile and rather easily accessible by classical wet chemical methods.

As an example, the introduction of hydroxy-groups by oxidation/reduction of nanodiamond and the subsequent modification with an activated double bond was carried out. Using the double bond to immobilize an amino modified oligonucleotide, a system for detection of miRNAs in living cells, based on fluorescence quenching, was assembled on nanodiamond.