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Annealing Behaviour of Hydrogenated and Oxidized Nanocrystalline Diamond J.A. SCHAEFER, A. NEUMANN, J. UHLIG, M. FINSTERBUSCH, M. EREMTCHENKO, S.I.-U. AHMED, Institut fuer Physik und Institut fuer Mikro- und Nanotechnologien, Technische Universitaet Ilmenau, J.A. GARRIDO, M. STUTZMANN, Walter Schottky Institute, Technical University Munich — Hydrogenated and oxidized nanocrystalline diamond (NCD) is a very promising material for future electronic, especially bioelectronic applications. In the past it has been shown that hydrogen, oxygen, and gases from the ambient environment as well as water can be responsible for causing drastic changes in surface conductivity and wettability (hydrophobicity, hydrophilicity), friction, wear, etc. In this contribution we have investigated differently prepared NCDs as function of the annealing temperature under ultrahigh vacuum conditions (UHV) with various electron spectroscopies like UPS and XPS as well as High Resolution Electron Energy Loss Spectroscopy (HREELS). We were able to identify the thermal stability of a number of different species at the interface, which are related to different characteristics of C-H, O-H, C-O, and C-C bonding. Finally, a carbonization of the interface appeared at higher annealing temperatures.

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