Diamond based functional materials have a great potential for application in many microelectronics related devices, because diamond surface when terminated with hydrogen or oxygen exhibits diametrically different electronic and adhesive properties with maintaining at the same time other typical for diamond outstanding properties, like extreme hardness, high thermal conductivity or biological stability.

It is possible to obtained either p—type conductive surface with hydrophobic character or non-conductive surface with super-hydrophilic character by hydrogen and oxygen termination respectively. The possibility to achieve different properties at the same surface by selective termination of chosen area, predisposes these materials for application in nano and microelectronics.

Despite quite successful attempts for application hydrogen and oxygen terminated surface in many interdisciplinary fields the real origin of their unique properties is still unclear and mechanism of oxidation process lacks of consistency for different techniques. Moreover different oxidation techniques might yield to different chemical composition or structure concentration. To fully understand process that occurs on diamond terminated surface the comparative study of structure, composition and chemical bonding must be perform.

Therefore in this project the comprehensive characterization of oxidized CVD diamond films with different grain size, form micro to nano crystal will be performed by applying of sensitive methods of materials characterization from field of nanotechnology.

Additionally, the oxidation process will be performed in three steps with increasing destructive character of the treatment. First step will be perform by UV ozone cleaning, then thermal annealing in air at $300^{o}$C and last one thermal annealing in air $600^{o}$C. This will enable to specify on what level the geometrical character of surface or composition influences characteristic H-, O- terminated surface properties. In this project it is planned to correlate the results obtained by different techniques, therefor the measurements will be always perform in the same micro-are after each oxidation step.