

FACULTY OF ELECTRONICS, TELECOMMUNICATION AND INFORMATICS
DEPARTMENT OF METROLOGY AND OPTOELECTRONICS
LABORATORY OF INNOVATIVE MATERIALS AND ELEMENTS

RESEARCH AREA

Optical diagnostics of thin films and bulk materials, Optical Plasma Diagnostics, PA CVD and PVD Deposition of Thin Layers, Magnetron Sputtering, Spectroscopic and Single Wavelength Ellipsometry in Thin Film Analysis, Fibre Sensors, Laser Diagnostics, Computations for Optics, Carbon materials, Diamond materials, Nanodiamond solutions, Doped diamond films, Raman spectroscopy, On-line process monitoring.

DESCRIPTION

Using technology of diamond electrodes can develop new sensors and effective processes of decomposition and mineralization. "Difficult" group of pollutants from chlorinated pesticides, quaternary ammonium salts of a surfactants and antibiotics, occurring in the waste from the pharmaceutical industry and industrial animal husbandry could be oxidized using diamond electrodes.

An alternative method of preparation of stable nanodiamond suspensions in various (water, ethanol, oils) solvents from dry detonation method nanodiamond (DND) powders is used. Due to strong agglomeration of beads in detonation nanodiamond powders, high amount of energy is needed to break them into smaller particles. Proposed method enables to obtain DND suspensions with particle size of 3 - 7 nm.

SAMPLE PROJECTS

Semiconducting structured diamond nanolayers for opto-electro-sensing systems

Deposition of nanocrystalline boron-doped diamond onto epitaxial GaN films for high power electronic and optoelectronic devices

Detonation nanodiamond suspensions

SAMPLE PUBLICATIONS

Electrochemical oxidation of ionic liquids at highly boron doped diamond electrodes, Phys. Stat. Sol. A. 209, 1797 (2012)

Enhanced Capacitance of Composite TiO₂ Nanotube / Boron-Doped Diamond Electrodes Studied by Impedance Spectroscopy. Nanoscale 2014, DOI: 10.1039/C4NR04417G

Thickness and Structure Change of titanium(IV) Oxide Thin Films Synthesized by the Sol-Gel Spin Coating Method. Optical Materials 2014, 36, 1739–1744

Research area for prospective doctoral or master students:

Optical diagnostics of thin films and bulk materials, Deposition of thin film by PA CVD and PVD deposition
Analysis of optical properties using spectroscopic ellipsometry, optical fibre sensors, diamond materials, diamond electronic devices, diamond heat spreaders.

CONTACT

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