PRESENTER INFORMATION

Name: Norek

First name: Małgorzata

E-mail: malgorzata.norek@wat.edu.pl

Institute/ affiliation: Military University of Technology

BIOGRAPHICAL SKETCH

Małgorzata Norek has been working at the Military University of Technology, Warsaw (Poland), first as an Assistant Professor (2009-2018), and later as an Associate Professor (2018-present). In the years 2003-2005 she worked in the Institute of Physics, Polish Academy of Science in Warsaw, where she investigated photophysical properties of aromatic molecules. She obtained twice EC Marie Curie Fellowship: at the University of Florence (2004), where she investigated symmetry of triplet states of monoazaphenanthrenes by Optically Detected Magnetic Resonance, and at the Delft University of Technology (2005-2008), where she worked on preparation and evaluation of Lanthanide (III) containing contrast agents for medical diagnosis and therapy. She got PhD at the Delft University of Technology in 2008. Currently, her scientific interests are focused on the synthesis and characterization of anodic aluminum oxide (AAO), fabrication and characterization of AAO-based photonic structures, templated synthesis of ordered nanostructures (e.g. SnO_2, ZnO), investigation of optical properties of selected semiconductor nanostructures and optimization of these properties by modifying their surface.

TITLE

Porous anodic alumina (PAA) and designing functional nanostructures based on PAA

ABSTRACT

Porous anodic alumina (PAA) is fabricated by electrochemical oxidation of aluminum. Self-organized growth of PAA resulting in a hexagonal close-packed (hcp) structure of pores occurs only within narrow anodization conditions. Usually these conditions are limited to a given voltage dependent on the acid species. Pore shape can be easily modulated by external electrochemical parameters such as applied voltage or current. This correlation is a base for designing various 1-dimensional photonic crystals (PCs). In the PCs, the effective refractive index is controlled by periodically modulated porosity along the whole PAA thickness. By application of well-designed pulse modalities and electrochemical conditions the gradient-index and step-index optical filters with photonic stop bands ranging from visible to mid-infrared spectral range can be produced. Moreover, PAA can be used for templated synthesis of other functional nanomaterials, such as ZnO.