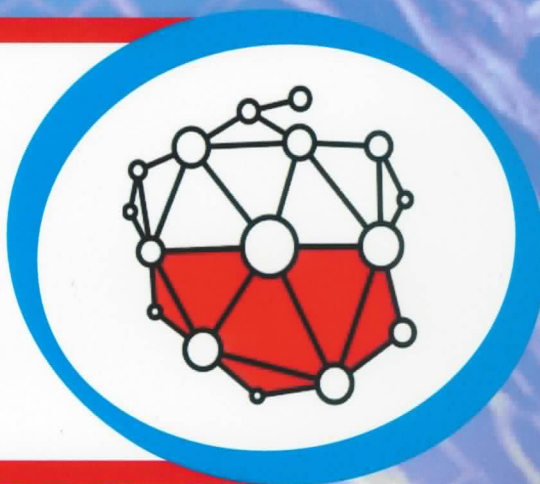


**Nano and Advanced Materials  
Workshop and Fair  
NAMF 2013**

Satellite event of  **FALL MEETING**

Warsaw University of Technology, Poland



**Central Campus of Warsaw University of Technology  
September 16-19, Warsaw, Poland**

**Technology transfer- from research to market**

<http://science24.com/event/namf2013/>



**EUROPEAN UNION  
EUROPEAN REGIONAL  
DEVELOPMENT FUND**

**nano  
FORCE**

18:00 Poster P10

**Synthesis and luminescence properties of Ln(III) doped Gd<sub>2</sub>(WO<sub>4</sub>)**Beata D. Grobelna<sup>1</sup>, Anna M. Synak<sup>2</sup>, Sebastian Mahlik<sup>2</sup>, Agata Lazarowska<sup>2</sup>, Karol Szczodrowski<sup>2</sup>, Marek Grinberg<sup>2</sup>, Piotr Bojarski<sup>2</sup>**1.** University of Gdańsk, Faculty of Chemistry, J. Sobieskiego 18, Gdańsk 80-952, Poland **2.** University of Gdansk, Faculty of Mathematics, Physics and Information Science (UG-MFI), Wita Stwosza 57, Gdańsk 80-952, Poland

e-mail: beata@chem.univ.gda.pl

Trivalent lanthanide ions show interesting properties due to the optical transitions within 4f<sup>n</sup>-electronic manifold. In luminescent material field, phosphors based on lanthanide ions play an important role because of sharp absorption and emission lines [1]. Nowadays, the three basic emission colors: blue, green and red are usually obtained with rare-earth materials. Eu(III) and Pr(III) ions exhibit intense red emission, Tb(III) ions show intense green emission. However, Dy(III) ions are known as two primary color phosphors. Luminescence spectra of Dy(III) present two characteristic bands at 480 nm (blue) and 575 nm (yellow) [2].

In the search for new luminescent materials we suggest to use tungstate as a host for lanthanide ions because of their specific energetic structure and optical properties of the WO<sub>4</sub><sup>2-</sup> group which absorbs UV radiation and emits visible light [3,4].

In order to enhance the Ln(III) emission the energy transfer process can be achieved by using Gd<sub>2</sub>(WO<sub>4</sub>)<sub>3</sub>. The luminescence properties of the phosphors were analyzed by means of emission and excitation spectra, including results of luminescence lifetimes of Ln(III) ions. Additionally, we used hydrostatic pressure applied in a diamond anvil cell (DAC) to change the interaction of localized electrons with the lattice and to change the energy of the localized states of Ln(III) with respect to the band edges [2].

Supported by the Ministry of Science and Information Techniques (Grant N R15 0029/2009)

## References:

- [1] C.R. Ronda, T. Jüstel, H. Nikol, J. Alloys and Compd. 275-277 (1998) 669.  
 [2] S. Mahlik, A. Lazarowska, B. Grobelna, M. Grinberg, J. Phys. Condens. Matter 24 (2012) 485501.  
 [3] B. Grobelna, J. Alloys and Compd. 440 (2007) 265.  
 [4] B. Grobelna, A. Synak, P. Bojarski, K. Szczodrowski, B. Kukliński, S. Raut, I. Gryczyński, Optical Materials 35 (2013) 456-461.

18:00 Poster P11

**Investigations of Raman Spectroscopy of C-Pd films for hydrogen sensor applications**Justyna Kęczkowska<sup>1</sup>, Elżbieta M. Czerwosz<sup>2</sup>, Małgorzata Suchanska<sup>1</sup>**1.** Kielce University of Technology (KUT), Al.1000-lecia PP no 7, Kielce PL-25-312, Poland **2.** Tele- & Radio-Technical Institute of Warsaw, Warszawa, Poland

e-mail: justynak@tu.kielce.pl

The work presents the results of Raman studies of carbon nanofilms containing Pd nanostructural films. The samples were obtained in two step method: physical (PVD) and physical/chemical deposition (PVD/CVD). Due to CVD modification of the PVD substrate films carbon nanofoam is formed. The analysis of Raman spectra confirms the presence of various carbon allotrope forms. For the PVD samples fullerite and nanographite grains are observed. For the CVD samples the amorphous carbon and/or graphite-like structure are observed.

C-Pd films containing Pd nanocrystals can be applied as active layers in proposed gas sensor applications

Acknowledgments - The work was supported from European Regional Development Fund within the Innovative Economy Operational Programme 2007-2013 (project No UDA-POIG.01.03.01-14-071/08-08)

18:00 Poster P12

**Application of silica-metal core-shell nanostructures for Surface Enhanced Raman Spectroscopy**Dominik Jamiola<sup>1</sup>, Bartosz Bartosewicz<sup>2</sup>, Bartłomiej J. Jankiewicz<sup>2</sup>, Piotr Nyga<sup>2</sup>**1.** Military University of Technology, Faculty of Advanced Technology and Chemistry, Kaliskiego 2, Warszawa 00-908, Poland **2.** Military University of Technology, Institute of Optoelectronics, Warszawa, Poland

e-mail: djamiola@wat.edu.pl

Studies of the silica-noble metal core-shell particles are fascinating mainly because of their unique structures and interesting physicochemical properties, which make them attractive for a variety of applications [1,2]. These structures are of great interest in biological and biochemical studies, for instance, in cancer diagnostics or pathogens identification, spectroscopy, e.g., surface-enhanced Raman spectroscopy (SERS), optical signal modulation and photonics.

In this paper we report an effective recipe for preparation of core-shell nanostructures consisting of spherical siliceous cores with diameter ca. 500 nm and gold or silver external shell layer (Fig. 1). We found the optimal process conditions to obtain products with desired size and morphology. Optical properties (extinction) of obtained silica-gold and silica-silver nanostructures were examined in wavelength range from 200 to 800 nm. SERS activity of prepared nanostructures was tested using standard compound – p-mercaptoaniline and revealed enhancement of the order of 10<sup>6</sup>.

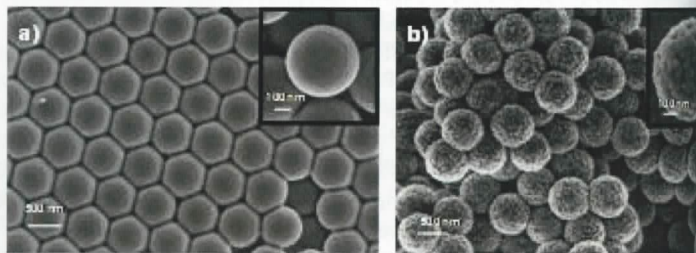


Fig. 1. Siliceous cores of nanostructures (a), silica-gold nanostructures (b) and silica-silver nanostructures (c)

[1] B.J. Jankiewicz, D. Jamiola, J. Choma, M. Jaroniec, Silica-metal core-shell nanostructures, Adv. Colloid Interface Sci., 2012, 170(1-2), pp. 28-47