Postdoctoral Research Project

PNII-RU-PD-2012-3-0090 Contract No. 27/26.04.2013

Silver nanoparticles - the effect of chemical surface modification on their chemical and biological reactivity

Duration: 01.05.2013 – 30/10/2015

Director of Project:
Dr. Mãdãlina Tudose

Mentor of Project:
Dr. Petre Ioniţã

Project Budget

Budget chapter (expenses)	2013(lei)	2014 (lei)	2015 (lei)	Total (lei)
Cheltuieli personal	50 000	60 000	10 000	120 000
Cheltuieli indirecte (regie)	19 200	18 000	10 800	48 000
Cheltuieli de deplasare	6 000	5000	9000	20 000
Cheltuieli de logistica	40 000	25000	35 000	100 000
TOTAL	115 200	108000	64 800	288000

Project Objectives

1. **Synthesis of silver nanoparticles (Ag NPs);**

2. **Coating the Ag NPs with silica for further organic derivatization (Ag@silica hybrid nanoparticles);**

3. **Organic derivatization of hybrid nanoparticles, with compounds known to have antibacterial properties;**

4. **Finally, to evaluate their antimicrobial properties (biological evaluation).**

5. **Synthesis of the new hybrid materials based on SiO_2 particles decorated with Ag NPs;**

6. **Functionalization of new materials with drugs used in cancer therapy;**

7. **Cytotoxicity studies of the new materials on tumor cells and on the keratinocytes.**

Dissemination of project results

Papers in ISI Journals

1. **The Influence of Redox Chemical Surface Treatments on Silver Nanoparticles**

   Madalina Tudose*, C. Munteanu, G. Marinescu, D. Culita, P. Ionita, Digest Journal of Nanomaterials and Biostructures Vol. 8, No. 4, 2013, p. 1761 - 1770.

2. **Silver nanoparticles embedded into silica functionalized with vitamins as biological active materials**

   Madalina Tudose*, Daniela C. Culita, Petre Ionita, Mariana C. Chifiriuc, Ceramics International41, 2015, 4460–4467.

3. **Antibacterial activity evaluation of silver nanoparticles entrapped in silica matrix functionalized with antibiotics**

   Madalina Tudose*, Daniela C. Culita, Cornel Munteanu, Jeanina Pandele, Elena Hristea, Petre Ionita, Irina Zarafu, Mariana C. Chifiriuc, J. Inorg. Organomet. Polym. DOI 10.1007/s10904-015-0176-7, 2015.

Dissemination of project results

Conferences

1. **The influence of redox chemical surface treatment on silver nanoparticles**

   M.Tudose, C. Munteanu, G. Marinescu, D. Culita, E. Hristea and P. Ionita, ROMPHYSCHEM 15th edition: September 11-13, 2013, Bucharest, Romania

2. **Synthesis of silver nanoparticles functionalized with antibiotics and their antibacterial activity**

   Madalina Tudose, Daniela Cristina Culita, Elena Nusa Hristea, Petre Ionita
   5th EuCheMS Chemistry Congress, 31 august- 4septembrie, 2014, Instanbul, Turcia.

3. **Silver nanoparticles embedded in silica functionalized with vitamins as biological active material**

   Madalina Tudose, Daniela C. Culita, Jeanina Pandele Cusu, Cornel Munteanu
   5th EuCheMS Chemistry Congress, 31 august- 4septembrie, 2014, Instanbul, Turcia

Dissemination of project results

Conferences

4. **Synthesis of Ag nanoparticles loaded SBA-15 and evaluation of their catalytic activity in oxidation of some alcohols**

   Ahmed Shakir, Cornel Ghica, Madalina Tudose, Daniela C. Culita, 7-8 mai 2015, Conference of the Romanian Society of Electron Microscopy, Bucharest, Romania.

5. **Hybrid material based on retinoic acid and Ag@SiO2 particles with potential applications in dermatology**

   Madalina Tudose, Daniela C. Culita, Adina M. Musuc, Cornel Ghica, Mariana C. Chifiriuc, 2-5 septembrie 2015,RICCCE, Sibiu, Romania.

Collaborations

- University of Bucharest, Faculty of Biology, Microbiology Immunology Department
- University of Bucharest, Organic Chemistry, Biochemistry and Catalysis Department
- Polytechnic University of Bucharest, Faculty of Applied Chemistry and Materials Science, Organic Chemistry Department
- Romanian Academy,' C.D. Nenitescu' Organic Chemistry Institute
- National Institute for Materials Physics