FA2-MS06-P01

Synthesis of Silver Nanoparticles in Polyelectrolyte Matrix. Jerome Girard[a], Katarina M. Fromm[a]. [a]*University of Fribourg, Chemistry Department, Switzerland.*
E-mail: jerome.girard@unifr.ch

Nowadays, a wide variety of composite materials consisting of polymers containing metal nanoparticles have been extensively investigated to realize their potential applications ranging from optoelectronics to biomaterials. Nanostructured materials consisting of silver nanoparticles (Ag-NPs) embedded in polymeric matrices show physico-chemical, optical and antibacterial properties [1, 2]. A simple method to prepare a AgNP/polyelectrolyte composite was successfully used. Thus, Ag-NPs were obtained through spontaneous formation of nanostructured silver from an Ag2O/polystyrene sulfonate (PSS) solution. The kinetics of Ag-NP-formation was investigated by dynamic light scattering and UV/vis spectroscopy, and related morphology was investigated by X-ray diffraction techniques. The synthesis of the Ag-NP/polystyrene sulfonate composite was performed by mixing a PSS solution in water with a Ag2O solution in diluted ammonia during 48 hours. The nanoparticle size was determined by TEM and SEM.

[1].Mantion, A., et al., *Soft Matter*, **2008**. 4(3): p. 606-617. [2]. Belser, K. et al., Angew. *Chem. Int. Ed. Eng.* **2009**, accepted for publication.

Keywords: polymers; silver compounds; nanoparticles

FA2-MS06-P02

Antimicrobial-Coated Surfaces. Priscilla S. Brunetto[a], Katharina M. Fromm[a]. [a]*Department of Chemistry, University of Fribourg, Switzerland.*
E-mail: Priscilla.Brunetto@unifr.ch

All commonly used implant materials, metals and polymers, seem to present a common problem: bacterial adhesion on their surfaces, mainly S*taphylococci.* The biofilm coated surface is resistant to pharmacological agents as well as host defences [1].
The current revival of silver chemistry in this context, the most powerful antimicrobial and antibacterial inorganic agent used safely in medicine for many years, initiated us to use this metal ion for coating purposes [2].
The combination of molecules derived from silver-polymer compounds and antibiotics would provide additive activity against most micro-organisms and thus the desired protection [3]. We focus on producing a series of newly developed silver-compounds for self-protective surfaces that aim at the prevention of bacterial colonization and eradicate implant associated infections [4]. The new compounds will be characterized by single crystal and powder x-ray analysis.

[1] P. S. Stewart, J. W.Costerton, *Lancet*. **2001**, 358, 135. [2] J. L. Clement, P. S. Jarret, *Metal-Based Drugs*. **1994**, 467. [3] B. Jose, V. Antoci, A. R. Zeiger, E. Wickstrom, N. J. Hickok, C*hem. & Biol.*. **2005**, *12*, 1041. [4] P. S. Brunetto, K. M. Fromm, Chimia, **2008,** *62(4),* 249-252.

Keywords: silver complexes; biomaterials; surface studies

FA2-MS06-P03

Structural and Electrical Properties of Specular Spin Valve with CuO_x Spacer. Mustafa Yildirim[a], R. Mustafa Oksuzoglu[b], Hakan Cinar[c]. [a]*Department of Physics, Graduate School of Science, Anadolu University, Eskisehir, Turkey.* [b]*Department of Material Science and Engineering, Anadolu University, Eskisehir, Turkey.* [c]*Department of Advanced Technologies, Graduate School of Science, Anadolu University, Eskisehir, Turkey.*
E-mail: mustafayildirim@anadolu.edu.tr

The Spin Valve having metal spacer (Cu) layer are showing Giant Magnetic Resistance (GMR) effect. Recent years, it has been reported that IrMn top Spin Valve (SV) as a function of Cu spacer thickness posses a pinning and ferromagnet/antiferromagnet transition [1]. However, this transition has been never observed in bottom SV until now. This transition and temperature dependence [2] have a critical role on the determination of sensor dimension in sensor production and application area. These types of sensors are using as a magnetic read head in $100Gb/in^2$ technologies [3]. To realize high sensitivity and use in the $100Gb/in^2$ technologies, the enhancement of GMR effect has been intensively investigated. The nano-oxide layer (NOL) in a specular spin valve (SPSV), the electron does not reflect from the NOL and conserve its mean free path of majority spin direction, is fairly effective to increase GMR effect and decrease signal/noise ratio [4]. Nano-oxides layers (NOLs) formed by the partial oxidation of CoFe pinned and free layers [5] results in increase of GMR effect. For the first time in this study, IrMn based bottom specular spin valves Ta (8 nm)/NiFe (8 nm)/IrMn (10 nm)/CoFe (2 nm)/CuOx (x nm)/CoFe (2 nm)/Ta (5 nm) are produced using both DC and Pulsed DC magnetron sputtering methods (DC-MS and Pulsed-DC-MS). The structural properties and electrical properties of these SPSV have been compared. Their structure determined by means of an X-Ray Diffraction, Rocking curve and X-Ray Reflection method, and correlated with its electrical properties measured by Four Point Probe technique. Also, we studied the effect of temperature dependence on the structure and their correlation with the electrical properties of this SPSV systems.
As a result of this study, we observed a ferromagnet/antiferromagnet transitions for the Pulsed-DC-MS deposited SPSV systems at Ar/O_2 ratio of % 15. Furtheremore, structural-electrical property correlations were comparison for SPSV systems deposited using both techniques DC and Pulsed DC.

[1] S. Jo, M. Seigler, *J. Appl. Phys.*, **2002**, 91, 7110. [2] S. Jo, M.A. Seigler, *Journal of Magnetism and Magnetic Materials*, **2007**, 316, 93-97. [3] L. Wang, J.J. Qiu, W.J. McMahon, K.B. Li, and Y.H. Wu, *Phys. Rev.*, **2004**, 69, 214402. [4] H. Yuasa, H. Fukuzawa, H.