Laboratoire PPSM – UMR CNRS 8531

Photochimie et Photophysique Supramoléculaires et Macromoléculaires

Séminaire PPSM

Vendredi 27 Octobre 2017 - 10h30

Auditorium D. Chemla - Bâtiment IDA

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Damascus, Syrie

Invité par : Isabelle Leray

«Polyaniline in nano- and bulk applications»

In this conference, the use of polyaniline PANI in the preparation of random and oriented nanofiber mats using the electospinning technique is investigated. In fact, the main challenge in preparation of those mats resides in achieving high and adjustable content of PANI. The spinnable solution should be non-agglomerated with no need to perform further filtration that might lead to wrong estimation of PANI content in the mat. This conference addresses this issue and reports the preparation and characterization of mats of polyaniline and polylactic acid, PANI/PLLA with adjustable and high content of PANI in the mats, 40% wt [1]. The preparation of PANi@PLLA mats by bulk oxidative solution polymerization of PANI onto electrospun non-woven fibers mats of PLLA is also investigated [2]. The comparison of the two types of mats will be discussed. These mats have potential applications in neural/bone tissue engineering as the simultaneous presence of electric stimulation with topographical cues could provide guidance for axonal extension/osteoblasts outgrowth.

On the other hand, this conference also investigates on the synergistic effect of use of PANI with nanoferrites for the design of a new generation of microwave absorbers. Actually, the new trend in the design of microwave absorbers is towards the preparation lightweight, broadband absorbers that have minimum reflection loss with tunable matching frequency [3,4]. This conference will present an attempt to solve this task by the preparation of multiconponent absorbers with dielectric and magnetic loss [5,6]. It will also highlight the role of core-shell structures of PANI@ferrites for the preparation of microwave absorbers.

References:

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2. "Oxidative solution polymerization of aniline hydrochloride onto electrospun nano-fibers mats of polyalactic acid: Preparation method and characterization". M. Jallad, Y. Atassi and E. Mounif. *Journal of Applied Polymer Science*, **132**, no. 11 (**2015**) 3426-3432. DOI: 10.1002/app.41618
3. "A promising lightweight multicomponent microwave absorber based on doped barium hexaferrite/calcium titanate/multiwalled carbon nanotubes". S.S. Afghahi, M. Jafarian and Y. Atassi. Journal of Nanoparticule Research, **18(2016)** 192-203. DOI: 10.1007/s11051-016-3499-6
4. "A new multicomponent material based on carbonyl iron/carbon nanofiber/lanthanum–strontium–manganite as microwave absorbers in the range of 8–12 GHz". S.S. Afghahi, A. Mirzazadeh, M. Jafarian and Y. Atassi. *Ceramics International*, **42**(**2016**) 9697-9702. DOI: 10.1016/j.ceramint.2016.03.058
5. "Electromagnetic properties of absorber fabric coated with $BaFe_{12}O_{19}$/MWCNTs/PANi nanocomposite in X and Ku bands frequency" A. Afzali, V. Mottaghitalab, S.S. Afghahi, M. Jafarian and Y. Atassi. *Journal of Magnetism and Magnetic Materials*, **442**(**2017**) 224-230 DOI: 10.1016/j.jmmm.2017.06.119.
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