Twenty-first Annual Conference

YUCOMAT 2019

&

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Programme
and
The Book of Abstracts

Organised by:

Materials Research Society of Serbia

&

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FOURTH YUCOMAT ORAL SESSION

Friday, September 6, 2019
Main Conference Hall

Session I: 09^{00}-11^{15}
Chairpersons: Natalia Kamanina and Bojana Obradović

09^{00}-09^{15} **Hemodialysis composite membranes with functionalized graphene**
Iulian Antoniac[1], Aurora Antoniac[1], Andrada Serafim[2], Andreea Iordache[2, 3], Andreea Madalina Pandele[2,3], Stefan Ioan Voicu[2,3]
[1]University Politehnica of Bucharest, Faculty of Materials Science and Engineering, Bucharest, Romania; [2] University Politehnica of Bucharest, Advanced Polymer Materials Group, Gheorghe Polizu 1-7, 011061 Bucharest, Romania; [3]University Politehnica of Bucharest, Faculty of Applied Chemistry and Materials Science, Department of Analytical Chemistry and Environmental Engineering, Str. Gheorghe Polizu 1-7, Bucharest, Romania

09^{15}-09^{30} **Supercritical CO_2 utilization in preparation of poorly soluble drugs solid dispersions**
Jelena Đuriš[1], Stoja Milovanović[2], Đorđe Medarević[1], Vladimir Dobričić[1], Svetlana Ibrić[1]
[1]University of Belgrade, Faculty of Pharmacy, Vojvode Stepe 450, 11221, Belgrade, Serbia; [2]University of Belgrade, Faculty of Technology and Metallurgy, Karnegijeva 4, 11120, Belgrade, Serbia

09^{30}-09^{45} **New agents for nitric oxide (NO) chemotherapy of bacterial infections**
Nataliya A. Sanina
Institute of Problems of Chemical Physics Russian Academy of Sciences, Chernogolovka, Russia

09^{45}-10^{00} **Controllable release of oxaprozin from hydroxyapatite nano-particles**
Vukašin Ugrinović[1], Bojan Božić[2], Đorđe Janaćković[3], Đorđe Veljović[3]
[1]Innovation Center of Faculty of Technology and Metallurgy, Belgrade, Serbia; [2]Institute of Physiology and Biochemistry, Faculty of Biology, Belgrade, Serbia; [3]Faculty of Technology and Metallurgy, Belgrade, Serbia

Y.O.S.IV.2.

Supercritical CO_2 utilization in preparation of poorly soluble drugs solid dispersions

Jelena Đuriš[1], Stoja Milovanović[2], Đorđe Medarević[1], Vladimir Dobričić[1], Svetlana Ibrić[1]
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Formulation of solid dispersions is one of the most feasible strategies for overcoming the poor drugs' solubility – one of the major issues affecting drug bioavailability and therapeutic outcomes. Since traditional methods used for preparation of solid dispersions often require usage of organic solvents, it is of great importance to seek for more environment-friendly methods. It has been demonstrated that supercritical (sc) CO_2 may be effectively utilized for dispersion of drugs into the suitable carrier (polymer), thus obtaining solid dispersions with the improved drug dissolution rate. The aim of the presented study was to investigate the potential of $scCO_2$ for preparation of poorly soluble antihypertensive drugs (carvedilol and valsartan) solid dispersions in the conventional pharmaceutical polymers (polyvinilypyrolidone-PVP and hypromellose-HPMC). Prepared solid dispersions were characterized by scanning electron microscopy, differential scanning calorimetry and Fourier-transform infrared spectroscopy; their porosity and density were determined and drug dissolution rate was assessed and compared to the results obtained from solid dispersions prepared by the traditional solvent casting method. Selected samples were tested for their tableting properties as well. It has been demonstrated that $scCO_2$ may be successfully applied for preparation of carvedilol or valsartan solid dispersions with the improved drug dissolution rate. Further characterization revealed the nature of interactions between the drugs and selected polymers. Due to the low density (and high porosity), some of the prepared solid dispersions may be used for further development of the floating dosage forms. It has also been demonstrated that some of the prepared dispersions have excellent compressibility and compactibility, which is of great importance for further development of solid dosage forms. The obtained results provide framework for further development of environment-friendly methods in pharmaceutical development and production.

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