Organization:

University of Ioannina

Department of Materials Science & Engineering

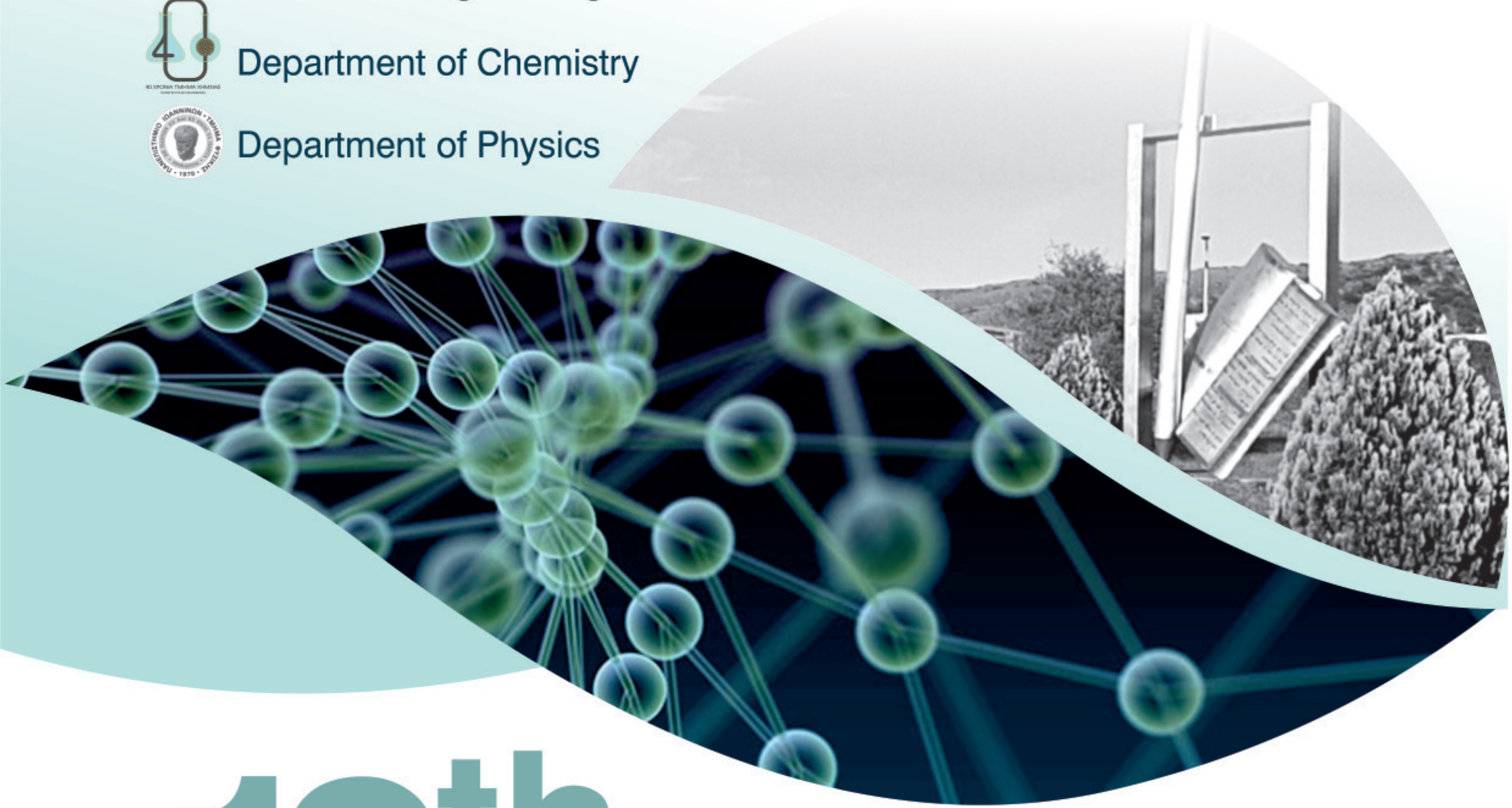
Department of Chemistry

Department of Physics

Under the auspices:

Hellenic Polymer Society

European Polymer Federation



12th Hellenic Polymer Society International Conference

2018

30 September - 3 October

Ioannina, Greece

Main Ceremony Hall, University of Ioannina:

"Georgios Mylonas"

ABSTRACT BOOK

POSTER 3.1

LAYER BY LAYER POLYMER COATED MESOPOROUS SILICA MICROPARTICLES FOR DRUG DELIVERY POTENTIAL APPLICATIONS

Kyriaki Evangelatou, Zacharoula Iatridi, Constantinos Tsitsilianis
University of Patras, Patras, Greece

Mesoporous silica microparticles (MSMs) have recently gained much attention because of their promising biomedical applications. MSNs have become a novel drug vehicle due to their unique properties like high surface areas, tunable pore sizes, large pore volumes and rich morphology. This work focuses on the development of Layer-by-Layer (LbL) polymer-coated MSMs. Firstly, the negatively charged MSNs were coated with a pH-sensitive P2VP-PEO block copolymer through ionic bonding between opposite charges. The MSM@P2VP-PEO was further coated with the PS_nPEO_n star copolymer, using Tannic Acid as a connector between the layers, due to its ability to form hydrogen bonds with PEO *(Figure 1*). The PS_nPEO_n star forms unimolecular micelles, constituted of PS hydrophobic cores surrounded by the PEO soluble arms. Thus, the formed PS_nPEO_n layers bear hydrophobic pockets capable of carrying hydrophobic agents (e.g. Nile red), while the MSM can carry hydrophilic agents (e.g. calcein) (see fluorescence microscopy in Figure 1). The characterization of the prepared colloidal microparticles was performed with TGA,ζ-potential, SEM, TEM and Fluorescence Microscopy. Finally loading and release of model drugs from these complex MSM were studied in 37 ^{0}C and at various pH, in order to evaluate whether or not the above system exhibits pH-controlled drug release.

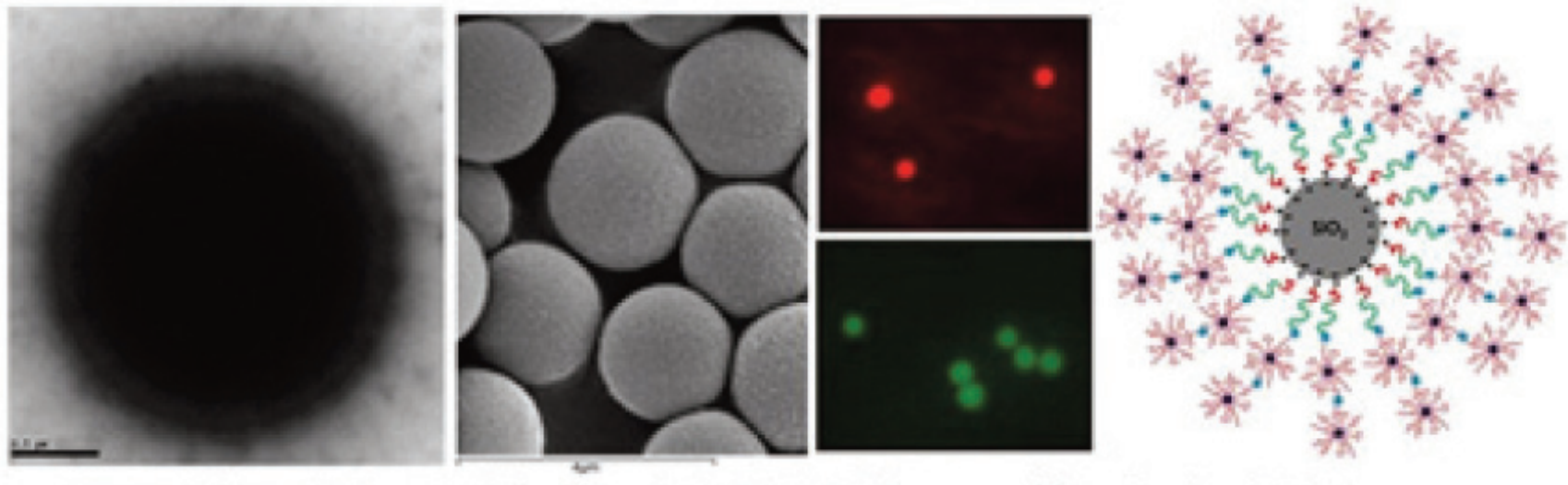


Figure 1: From the left to the right: TEM, SEM images of functionalized MSMs, fluorescence microscopy of functionalized MSMs loaded with Nile red (top) and calcein (bottom) and illustration of the LbL polymer-coated MSMs.