Dr. A. R. Phani

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Dr A. R. Phani obtained B.S and M.S (Applied Chemical Technology) from College of Engineering, Andhra University, Ph.D (in Materials Chemistry) from Indian Institute of Chemical Technology, Hyderabad, Post graduate Diploma in Industrial Pollution Management from JNTU, Kakinada, Post Graduate in Business Management from Pondichery University. He served as Post Doctoral Research / Research Associate / Associate Prof. in Department of Materials Engineering, University of L'Aquila, Italy, Researcher (appointed through Dept of Physics) in Texas Instruments, Avezzano, Italy, Asst. Research Professor at Dept. of Mechanical and Materials Engineering, Univ.of New Hampshire, NH, USA (in US Air Force project "Multilayered TiC /B_4C coatings for steel ball bearings") Senior R&D Engineer, Micro and Nanomaterials Section, Center for Swiss Electronic and Microtechnology, (CSEM) Neuchatel, Switzerland, Materials Scientist, CASTI, CNR-INFM Regional Laboratory, Univ.of L'Aquila, Italy, CEO for Start up of Nano CAT a spin off company from University of L'Aquila, Italy, Managing Director, Nano RAM Technologies, Bangalore. Presently he is pursuing MBA and D.Sc.

He has successfully participated in 3 NSF Projects, 1 ESA project, 5 EU projects, 12 Indian Projects, 2 COST Projects and 2 Indian Government Projects.

His area of Research Expertise include Materials Science & Engineering, Bio-medical technology, Biochemistry, Solid State Semiconductor Physics, Pharmaceutical Biotechnology, Cosmotology and nanomedicine.

He has 171 international Publications, is the Journal Reviewer for over 26 International Journals and has reviewed 4 International projects. He is an editorial member in Materials

Research Society (USA-Europe-Asia), AVS, ISBT, PPS, etc. He has Research Collaborations with USA, Germany, Spain, France, Italy, Israel, Singapore, Malaysia, Canada, Japan, Australia, Malaysia and Thailand.

Innovative nanostructured materials for Pharmaceutical Applications - chitosan–polycaprolactone blend for control delivery of ofloxacin drug

The nanotechnology is considered to have great potential for the development of new innovative materials with an environmental advantage, the so-called 'eco-innovation' materials. However, it is necessary to have in-depth understanding in this area, in order to facilitate and not at least to accelerate implementation of nanocoatings or nanomaterials in different end products. Nanostructured materials (in particular Inorg-polymer, org-polymer, hybrid coatings) are expected to create radical changes in diverse fields. Potential applications for micro and nanostructured materials include pharmaceuticals, cosmetics, medical diagnostics, catalysts and supports, membranes and filters, batteries and fuel cells, hydrogen storage systems, electronic, magnetic and optical devices, flat panel displays, biomaterials, drug delivery systems, structural materials and protective coatings. To meet the requirements, the sol-gel process represents a flexible chemical route to synthesize various high performance nanostructured materials with controlled internal morphology and chemistry. Materials with designed internal nanostructure (entirely interconnected open nanoporosity, hierarchical, fractal or nanocrystalline solid network), and various possible chemical compositions (from organic to inorganic) can be processed and designed through a large range of shapes (finely divided nanopowders, nanoparticles, thin and thick films, fibers, granular beds and monolithic materials). The sol-gel process is a solution-based technique, where the material structure is created through chemical reactions in the liquid state, giving the high flexibility of the process for easy application. In the present work it will be demonstrated that sol-gel technology can alone bring all the nanomaterials (nanostructured thin films, nanostructurted coatings, nanocomposites, inorg-polymer hybrid coatings, nanostructured conducting polymers, aerogels, hydrogels, xerogels, nanoparticles, nanofibers, nanospheres) to apply to various industrial applications that include energy, transport, health, food, Pharma and life sciences.

In the present research work chitosan has been blended with different amounts of polycaprolactone (PCL) (80:20, 75:25, 60:40 and 50:50) for using them for control delivery of ofloxacin. The blends were characterized by Fourier transmission infra red spectroscopy (FTIR), UV–visible spectroscopy (UV), scanning electron microscopy (SEM), X-ray diffraction (XRD)

analysis. From the FTIR spectra the various groups present in chitosan and PCL blend were monitored. The homogeneity, morphology and crystallinity of the blends were ascertained from SEM and XRD data, respectively. The swelling studies have been measured at different drug loading. The kinetics of the drug delivery system has been systematically studied. Drug release kinetics was analyzed by plotting the cumulative release data vs. time by fitting to an exponential equation which indicated the non-Fickian type of kinetics. The drug release was investigated at different pH medium and it was found that the drug release depends upon the pH medium as well as the nature of matrix.