

**NATIONAL SEMINAR ON
RECENT TRENDS IN ADVANCED
CHEMISTRY RESEARCH (RTACR - 2017)**

**(SPONSORED BY DST(SERB)& KSCSTE)
THURSDAY 25th AND FRIDAY 26th MAY 2017**



Organized By

**PG & RESEARCH DEPARTMENT OF CHEMISTRY
SREE NARAYANA COLLEGE, KOLLAM**

Affiliated to University of Kerala

(Re accredited by NAAC with 'A' grade)



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Welcome

Dear Participant,

On behalf of the organizing committee, it gives us great pleasure to extend a warm and hearty welcome to the participants of RTACR-2017.

Over the years, Chemistry has made major studies in many different disciplines. The influence of chemistry could be witnessed across disciplines such as Physics, Material science and Biology, in addition to others. It was therefore felt by the organizing committee to organize sessions based on different themes viz, Nano science, Photoscience, Computer aided drug design & Medicinal Chemistry and Material science, wherein chemistry has made major impact over the years. We do hope that this would be a helping hand for the researchers for further inclusive growth with interdisciplinary research.

We have arranged inaugural session, and invited lectures in different themes mentioned above. The lectures by the young researchers and poster sessions will also be held in the seminar hall of the college.

We wish you a professionally rewarding and enjoyable RTACR-2017 seminar.

Sincerely yours,

Dr. Ambili Raj D B (Convenor)

Dr. S. V. Manoj (Joint-Convenor)

T. R. Sarunkumar (Joint-Convenor)

PREFACE

The National Seminar on 'Recent Trends in Advanced Chemistry research-2017' (RTACR-2017) is being organized by The PG & Research Department of Chemistry, Sree Narayana College, Kollam on 25th & 26th May 2017 at S N College, Kollam. The RTACR-2017 seminar aims to focus on the current status and the future projections of research in various frontier areas in Chemistry. The organization of the seminar is based on the outstanding and significant research carried out by scientists from various parts of India. The Poster and Oral presentation sessions give ample opportunities to the young minds to interact with others and to benefit from exchange of ideas for the betterment of their research activity.

We thank the National Advisory Committee members of RTACR for their valuable suggestions in organizing the seminar. We also thank the sponsors of the symposium, SERB, Department of Science & Technology, Govt. of India and Kerala State Council for Science, Technology & Environment (KSCSTE), Govt. of Kerala for providing financial Support. On behalf of all the organizing committee members, it gives me great pleasure to wish all the participants an eventful and academically successful RTACR-2017 Seminar.

Dr. Ambili Raj D B

Covenor, RTACR-2017

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Synthesis Of Superparamagnetic Iron Oxide Nanoparticles And Its Functionilization Using A Chemotherapeutic Drug

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ABSTRACT

Super paramagnetic iron oxide nanoparticles (SPIONs) were synthesized by chemical co-precipitation method and were coated with 3-Aminopropyltriethoxysilane and chemotherapeutic drug, doxorubicin. The magnetic nanoparticles showed excellent response to magnetic field and the saturation magnetization was found to be approximately 40 emu/g. XRD revealed that the crystalline size of SPIONs is approximately 11 nm. The FTIR analysis justifies the hydrogen bonding interaction between silanol groups of 3-aminopropyltrimethoxysilane and the carbonyl groups of citric acid. It also justifies that the attachment of doxorubicin to the silica coated iron oxide nanoparticles occur via the interaction of NH₂ and OH groups of doxorubicin with OH and NH₂ groups on the nanoparticle surface through hydrogen bonding.

Introduction

Superparamagnetic iron oxide nanoparticles (SPIONs) have finite size and fast response to applied magnetic field with negligible remanence and coercivity and find significance as a potential candidate for various application fields such as catalysis, biotechnology or biomedicine, magnetic resonance imaging (MRI), data storage, biolabelling and bioseparation [1-5]. Several popular methods including chemical co-precipitation, thermal decomposition, micelle synthesis or microemulsion technique, hydrothermal synthesis etc can all be directed at the synthesis of magnetic nanoparticles [6-8]. Chemical co-precipitation is a facile and convenient method to synthesize iron oxide nanoparticles [9]. Protection or stabilization of magnetic nanoparticles can be achieved by silica coating, surfactant or polymer coating, carbon coating, precious metal coating etc, among which coating with silica is a simpler and easier approach [10-12]. Further functionalization of stabilized magnetic nanoparticles with specific components such as catalytically active species, various drugs, specific binding sites or other functional groups lead them towards specific applications. Many reports are available on the functionalisation of SPIONs for chemotherapeutic treatments [4-5]. However the development of specific drug targeting devices still remains a challenge. Therefore in the present study an attempt was made to synthesis functionalised SPIONs using 3-aminopropyltrimethoxysilane and further a known chemotherapeutic drug, doxorubicin, was attached to the functionalized SPIONs.

Materials And Methods Superparamagnetic iron oxide nanoparticles (SPIONs) was prepared by the standard co-precipitation method using FeSO₄ and FeCl₃ as precursors in 1:2 molar ratio.