

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

**(SPONSORED BY DST(SERB)& KSCSTE)  
THURSDAY 25<sup>th</sup> AND FRIDAY 26<sup>th</sup> 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 25<sup>th</sup> & 26<sup>th</sup> 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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# Preparation of Polyaniline-Ceria Nano-Hybrid Composite

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## Abstract

Ceria nanoparticles were modified by polyaniline(PANI) using 'in situ' chemical oxidative polymerization method in hydrochloric acid medium. The PANI-ceria nanohybrid composite at different reaction time were characterized with X-ray diffraction (XRD), Scanning Electron Microscopy (SEM) and Fourier-Transform Infrared Spectra (FTIR). Ceria incorporation modified the amorphous characteristics of PANI to crystalline behavior with ceria incorporation. The increase in reaction time improved the crystallinity of composite.

## Introduction

Polyaniline (PANI), a conducting polymer with unique combination of electrochemical, electrical, thermo-electrical, optical, environmental and chemical stability, unique acid/ base doping/dedoping, their ease of synthesis, and low cost extended its application in various technological sectors [1]. The chemical oxidative polymerization method with simple and convenient operation is the common approach for PANI preparation [2]. The green protonated emeraldine form of PANI with semiconductor level conductivity  $100 \text{ S cm}^{-1}$  was most preferred than common polymers with conductance magnitude higher. The major the scientific interest in PANI stems from its unique structure with the existence of different protonation and oxidation states.

Recently, organic-inorganic hybrid materials with synergetic behavior find wide application in electronic and nanoelectronic devices [3]. Several reports on the PANI-inorganic hybrid materials synthesis with the inorganic materials  $\text{TiO}_2$ , graphene, CNT, layered silicates, CdS,  $\text{Na}^+$ - montmorillonate, Pd and Au have been well studied [4,5]. In these works, Pickering emulsion method was carried out in the preparation of PANI-inorganic hybrid materials [6].

Ceria, a rare earth oxide with special chemical and physical characteristics have been widely used in optics, electronics, metallurgy, chemical and material engineering. Ceria incorporated composites have good friction, corrosion and wear resistance [7]. However, PANI-ceria hybrid nanocomposite has not been much studied by Pickering emulsion approach. In the present work, we report a facile and effective method for the dilution polymerization of aniline in the presence of aqueous emulsion of nano ceria to prepare PANI-ceria nanohybrid composite. The nanohybrid composite was characterized by Fourier Transform infrared spectroscopy (FTIR), X-ray Diffraction (XRD) and Scanning Electron Microscopy (SEM).