

Chief Guest



Dr R. Chidambaram, DAE Homi Bhabha Chair Professor, former Principal Scientific Adviser to GOI, Chairman-Atomic Energy Commission and Director, Bhabha Atomic Research Centre, Mumbai has kindly consented to be the Chief Guest on this occasion.

Registration Fee:

Students: Rs 500/-

Other Participants: Rs.1000/-

The registration fee can be paid through **DD / A/C Payee cheque / RTGS / NEFT** payable in the name of "Analytical Science at NCCCM: A journey over 25 years", payable at SBI, Cherlapally Industrial Estate, Moula-Ali, ECIL Post, Hyderabad-500062. IFSC Code: SBIN0002714.

Travel support will be available to a few deserving students.

Accommodation:

Arrangements will be made on payment basis to accommodate the participants in the Govt.Guest house/students hostel, in addition to leading hotels in the city, on first cum first serve basis.

Important Dates:

Submission of Extended Abstract: 20.10.2018

Acceptance of Extended Abstract: 25.10.2018

Submission of Registration forms
and payment of registration fee : 15.11.2018.

Contact details:

Convener: **Dr Sunil Jai Kumar, Head, NCCCM,**
04027121365, 9951911772

Email Id: suniljaikumar@rediffmail.com

Secretary: **Dr Sanjiv Kumar, Head, SPMS**

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Email Id: sanjuccm@rediffmail.com

Registration Form

Name of the Author:

Paper Id:

Paper Title:

Designation:

Educational Qualifications:

Institution:

Mobile:

Email Id:

Registration Fee enclosed Rs:

Total Amount enclosed Rs:

Mode of Payment : DD/ A/C Payee cheque / RTGS / NEFT

Address for Communication:

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Declaration: The information provided is true to the best of my knowledge. I hereby forward and recommend the above applicant for attending the conference.

Signature of the Applicant

Signature of
Head of the institution

A two-day DAE-BRNS sponsored seminar

"Analytical Science at NCCCM: A Journey over 25 Years"

Dates: 30th Nov., and 1st Dec., 2018

Venue: NCCCM/BARC, Hyderabad - 500062

A view of class 100 clean room



About the Centre

The National Centre for Compositional Characterisation of Materials was setup in 1993 at Hyderabad and has completed 25 years of its existence in the service of the nation.

The major objectives of this Centre are:

- Specialised analytical services for the determination of measurands down to sub-parts per billion levels of concentration
- Validation support to analytical efforts in research & industry
- Providing training to analytical scientists
- Development & supply of reference materials
- Consultancy services to industries in process optimisation and product evaluation

The Centre has achieved significant milestones in analytical sciences in last two and half decades and some of the salient activities carried out over these years are:

Analytical Services: Some of the major organisations we serve Department of Atomic Energy (DAE):

Atomic Minerals Directorate for Exploration & Research (AMDER)
Bhabha Atomic Research Centre (BARC)
Electronics Corporation of India Limited (ECIL)
Heavy Water Board (HWB)

Nuclear Fuel Complex (NFC)
Nuclear Power Corporation of India Ltd (NPCIL)

Non-DAE :

Andhra Pradesh Pollution Control Board (APPCB)
Andhra Pradesh Power Generation Corporation (APGENCO)
Boron Carbide India Limited
Central Council for Research in Ayurvedic Sciences (CCRAS)
Centre for DNA & Finger printing Diagnostics (CDFD)
Centre for Materials for Electronics Technology (C-MET)
Defence Metallurgical Research Laboratory (DMRL)
Dr. Reddy's Laboratories
EESAVYASA Technologies
Environment Protection Training & Research Institute (EPTRI)
GIMPEX Pvt Limited
Hindustan Aeronautics Limited (HAL)
India Government Mint (IGM)
Indian Space Research Organisation (ISRO)
ISRO Satellite Centre (ISAC)
Institute for Plasma Research (IPR)
Indian Institute of Technology (IIT)
Indian Institute of Chemical Technology (IICT)
International Advanced Research Centre for Powder Metallurgy & New Materials (ARCI)
Jawaharlal Nehru Technological University (JNTU)
KL University
Nagarjuna University
National Aluminium Company Limited (NALCO)
Non-Ferrous Materials Technology Development Centre (India) NFTDC
National Geophysical Research Institute (NGRI)
Osmania University (OU)
Semiconductor Complex Limited (SCL)
Vedanta Limited
Virchow Biotech Pvt Limited
Universal Oil Products (UOP) India (Honeywell company)

Biological Materials:

- Determination of DNA and Cobalamine
- Develop green synthetic methodologies for production of metal nanoparticles for biological and environmental applications.

Environmental Analysis:

- Determination of Be at femtogram levels in environmental specimens
- Water
- Soil, Sediments
- Lichens

ISO Accreditation:

- The Centre is an ISO/IEC 17025 accredited laboratory in the field of chemical testing

- ISO 34 accredited laboratory as reference materials producer by National Accreditation Board for testing and Calibration laboratory (NABL), New Delhi

Instrumentation:

- Development of Resonance Ionization Mass Spectrometer with Reflectron type Time of flight analyser (RIMS - RTOF) for detection of analytes at ultra-low levels
- Development of High-resolution Atomic Beam Fluorescence Spectroscopy Facility for Precision Measurements of Isotope Shifts and Hyperfine Structure
- Electrolyte cathode discharge atomic emission spectrometry (ELCAD-AES)
- Sputter deposition systems for thin films
- Development of GD source
- Mass flow controller for gas flows

Metals & Alloys:

Characterisation of

- Nickel based super alloys
- Copper, lead, Steel
- ZrB₂-SiC & SiC, Zr-2.5Nb
- Enriched ¹⁰B, Boron carbide
- BeO
- PbLi & PbBi

Petrochemicals:

- Naphtha
- Refinery waste water

Pharmaceuticals:

- Cs and Hg in Hepatitis B Vaccine
- Ayurvedic formulations

Pure Materials:

- Analysis of high purity Gallium (6N), Tellurium (7N), Arsenic (5N) and Germanium (9N), Cadmium (5N), Antimony (5N), Quartz (5N)
- Analysis of high purity chemicals for semiconductor application

Reference Materials (RMs):

Three RMs have been produced 1. Trace elements in quartz powder (BND 4101.01), 2. High purity gold standard (BND 4201) for IGM Mumbai and 3. Total lead content in noodles (BARC D 3101), available for sale



Gold Standard BND4201



Lead in noodles BARC D 3101



Trace elements in quartz powder BND4101.01

Remediation Technologies:

A cost effective technology for the remediation of fluoride from ground water has been developed. This technology is suitable for rural areas, as there is no need for electricity.

This Technology has been transferred to:

- M/s LTEK Systems, Nagpur
- M/s Shrinathji Kayakalp Remedies, Raisen-Bhopal
- M/s Associate Enterprises, Rajanand Gaon
- M/s toyaM Technologies India Pvt Limited, Pune
- M/s Rite Water Solutions (I) Pvt Limited, Nagpur



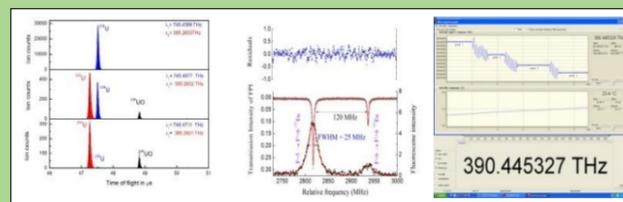
Prototype plant for fluoride remediation



Adsorbent for fluoride remediation

RIMS AND LASER SPECTROSCOPY :

- Isotope Selective excitation of ²³⁵U isotope by RIMS and detection of absolute quantity of ~ 5 pg of Uranium in sample
- High-resolution laser spectroscopy on atomic Europium by orthogonal interaction of cw laser beam with the collimated atomic beam effusing out from a narrow graphite crucible
- Ultra-high resolution Doppler-free two-photon spectroscopy of high lying excited levels of various alkali elements
- Acousto-Optic (AO) and Electro-Optic (EO) modulator techniques for frequency markings and precise locking of the laser to the atomic spectra



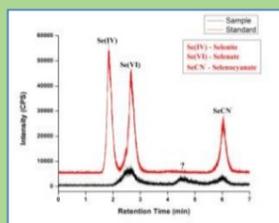
U RIMS TOF spectra

High resolution Eu atomic spectra

Frequency locking to Cs hyperfine peaks

Speciation Analysis:

- Speciation analysis of toxic species: Chromium (III) & (VI) Arsenic (III) & (V), Selenium (IV) & (VI), Inorganic and Methyl Mercury



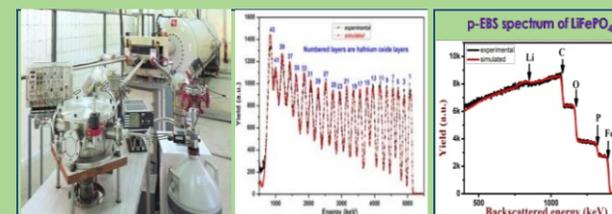
Selenium Speciation



Cr Speciation work inside cover page of RSC journal JAAS-August-2016

Surface analysis: Depth Profile, Compositional Analysis, Thin Films

- Measurement of the thickness of the multilayered coating on micro-switches of Electronic Voting Machines
- Decryption of the layer structure of multilayered antireflection optical coatings and multijunction solar cells



3MV Tandron

RBS Spectrum of a 43 Layered Film

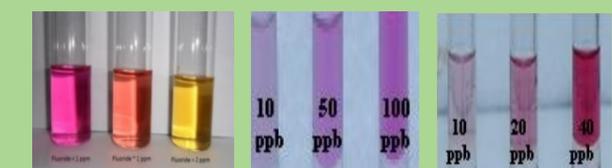
p-EBS Spectrum of LiFePO₄/C

Visual detection kits: Smart phone App

The Centre has developed different visual detection kits for the detection of

- Fluoride
- Cr(VI)
- Iron

in ground water. The method is also being developed as field detection technique using mobile App compatible to a smart phone, where the exact concentration can be known and data can be stored for future use.



Fluoride detection

Cr(VI) detection

Iron detection

The Technologies have been transferred to:

- M/s LTEK Systems, Nagpur
- M/s Plasti Surge Limited, Amravati
- M/s Orlab Instruments, Hyderabad
- M/s H.S. Industries, Hyderabad
- M/s Shrinathji Kayakalp Remedies, Raisen-Bhopal
- M/s Max chemicals (India), Indore
- M/s Transchem Agri Tech, Vadodara

About the seminar

The two day seminar will highlight the major achievements made at NCCCM in analytical sciences in the past 25 years. Experts from each of these fields will be invited to deliver talks. Poster presentation from the participants will be accepted after reviewing the extended abstract.

The topics that will be covered in the seminar are:

- Pure materials
- Metals and Alloys
- Surface analysis
- Elemental speciation studies
- Environmental analysis
- Remediation technologies and detection kits for F, As, Fe and any other toxic pollutants
- Production of Certified Reference Materials

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