



Bose Colloquium

S. N. Bose National Centre for Basic Sciences

(An Autonomous Research Institute established under DST, GOI)

Title:

Translational Materials Research: Crossing the Valley of Death

Abstract:


Energy materials research is emerging as highly important field of materials research especially due to emerging technologies related to electric vehicles and green hydrogen.


This enables compliance with the "Paris Agreement" which specify targets for the reduction of greenhouse gas emissions on a global scale to limit the increase in the global warming and climate change. There is a huge requirement of these materials globally as the commercialization of technologies related to batteries, fuel cells, electrolyzers, hydrogen storage systems are growing very rapidly. This situation gives an excellent opportunity for researchers in two ways. Firstly, develop new processes indigenously to make known materials in a scalable way, so that Indian industries can use these technologies for mass production and commercialization to cater to the domestic needs.


Secondly, innovation in development of new materials and new alternatives considering the Indian conditions is very important. ARCI has developed Indian relevant tropical battery materials like lithium ion phosphate (LFP) and lithium titanate (LTO) at pilot-scale level and reached to technology readiness level (TRL) of 6-7. ARCI is also proactive in tuning its goal posts in line with the emerging energy technologies, which are futuristic both for short time and long time adoption. For example, Sodium ion batteries are rapidly emerging as alternative to Li ion batteries and it is very important to progress in this technology especially for India, as there are no lithium sources available in the country. There has been a significant progress in this technology globally and ARCI is rapidly progressing in developing materials for Na-ion batteries and attempting to climb to higher TRL levels.

ARCI has taken a lead role in advanced manufacturing as well, especially in additive manufacturing (AM). Various systems such as Selective Laser Melting (SLM) and E-Beam melting (EBM) are established and several products critical for strategic, automotive, power and medical sectors are being developed at different TRL levels. More importantly, various alloy powders required for AM processing are being developed by inert gas atomization and the suitability of these powders for AM processing is being demonstrated.

The present talk starts with status of energy storage technologies in India with special relevance to electric vehicles (EVs) and the need for materials technologies will be discussed. The contributions of ARCI in technology development of energy storage materials and the strategies and road map for future technologies will be presented. The last part of lecture will briefly include the progress made on materials and processes for additive manufacturing at ARCI.

 **02nd May, 2024**

 **4.00 PM**

 **Silver Jubilee Hall**

 **YouTube Link**

 **Webinar Link**



Speaker: *Dr. Tata Narasinga Rao, Director, International Advanced Research Centre for Powder Metallurgy & New Materials (ARCI)*

Short Biography of the Speaker:

Dr. Tata Narasinga Rao received his Ph.D. degree from Banaras Hindu University, India in 1994. After his post-doctoral work in Tokyo University, he joined International Advanced Research Centre for Powder Metallurgy and New Materials (ARCI), Hyderabad, India, in 2003 as senior scientist, and presently he is serving as a Director of ARCI. His research interests include electrochemistry and nanomaterials with special reference to supercapacitors, Na-ion batteries, Room temperature Na-S batteries and Li-Sulfur batteries etc. Dr. Rao has published ~200 research papers and filed/granted more than 20 international and Indian patents, several of which have been translated to technological developments. He is recipient of Material Research Society of India (MRSI) Medal-2009; Tokyo University of Science President Award- 2014; Technology Day National Award-2016; Bangalore India Nano Innovation Award-2018 etc.