

Title: Big thinking about small things – on the nanoscale in fact!

Abstract: Imagine a sticker, slapped onto a miner's sleeve that could warn underground workers about the presence of toxic or flammable gases; or a material that could adsorb heavy metal pollutants from mine wastewater without the need for large, expensive and power-hungry purification equipment. Such elegant solutions in the context of local challenges like mine safety, pollution, electricity supply, and providing clean water to communities, would make a big difference and it requires big thinking.

Nanomaterials, incorporated into disposable paper-based sensors, plastics, cosmetics and other composite materials, represent an enabling technology for industries in South Africa and the world. Translating technologies into products is what drives me every day. I have an interesting position here at the Council for Scientific and Industrial Research (CSIR). I'm fulltime manager and a fulltime researcher. Research and commercialisation really excite me, and there is a lot of opportunity to make a difference. I think, this has excited me for the last ten years, and it will excite me for the next ten years. Through this lecture, I will take you, in my journey, where I take nanomaterials from skies....blue to industry-enabler.

About speaker: Suprakas Sinha Ray was born in 1973 and completed his PhD studies at the University of Calcutta in 2001, and then postdoctoral fellow at Toyota Technological Institute (Japan) and Laval University (Canada) studying the structure-property relationship in nanoclay-containing polymer nanocomposites. He started working on fundamental understanding to real applications of polymer-based nanostructured materials when he joined the CSIR as a group leader. These studies advanced and broadened when he appointed as a chief researcher (level III, highest SET position in CSIR) and director of the DST-CSIR NIC, National Centre for Nanostructured Materials and growing to the present time with postdoctoral fellows, students, collaborators and industrial partners worldwide. Currently, more than 93 researchers, engineers and technologists are working with him. Over the last nine years **Prof. Ray produced 45 young researchers** and all of them have already gained positions in industry, research councils, academia and other research institutions throughout South Africa, underscoring the value of the scarce-skills training and mentoring received whilst at the Centre. Under Prof. Ray leadership, the Centre has taken relatively inexperienced interns, honours students, post-graduate students, postdoctoral fellows and staff, and developed skills in them that are in short supply both locally and internationally.



Prof. Ray pioneered the use of nanoclays to improve key properties of polymers. He is one of the most active and highly cited authors (his articles have been cited more than 16300 times, h factor 44, Google/Scopus/web of Science, S.S.Ray, S. Sinha Ray, S. Sinha-Ray), in the field of polymer nanocomposite materials and his work has been featured on various international journal cover pages on 15 different occasions. Recently, he has been rated as a **Top 1% of most impactful and influential scientists (Chemistry, Materials Science and 22 Science disciplines)** by *Thomson Reuters Essential Science Indicators*. In 2011, he also has been rated as a **Top 50 high impact chemist in the world** (Feb. 2011, Thomson Reuter, probably youngest researcher in this list out of 1.2 mil Chemist world-wide). So far he has given more than 40 plenary/keynote/invited presentations in various international conferences and organized/co-organized a number of international conferences. Prof. Ray is the author of 2 books, co-author of 3 edited books, 17 book chapters on various aspects of polymer-based nano-structured materials & their applications, and author and co-author of 283 articles in high-impact international journals, 30 articles in national and international conference proceedings. His team also commercialized more 16 different polymer nanocomposites. He also has 4 patents (a number of them are in registration process) and 8 new demonstrated technologies shared with colleagues, collaborators and industrial partners.

His honours and awards include **Prestigious 2016 National Science and Technology Award (NSTF)**; **Prestigious 2014 CSIR-wide Leadership award**; **Prestigious 2014 CSIR Human Capital development award**; **Prestigious 2013 Morand Lambla Awardee** (top award in the field of polymer processing worldwide), International Polymer Processing Society, USA; Distinguish Professor of Chemistry, University of Johannesburg, South Africa (2017-); *Fellow Royal Society of Chemistry*, UK (2016); *Distinguish Professor*, King Abdulaziz University, Kingdom of Saudi Arab (2012); *Extraordinary Professor*, University of Pretoria, South Africa (2013); Visiting

Professor, University of Johannesburg, South Africa (2012); **Global Star Award 2011** from the Engineering ceramic division, the American Ceramic Society; CSIR MSM Prestigious Established Researcher Award (2010); Adjacent Professor, Free State University, South Africa (2009); **Prestigious CSIR President's Award** (2008); CSIR MSM Director's award (2008); **JSPS Postdoctoral Fellowship** from the Japanese Government (2002). He is also holding NRF B-rating. Currently, he is serving as an Associate Editor/Editorial Board member of the RSC Advances, Journal of Nanoscience and Nanotechnology, Advanced Science Letters, International Journal of Plastic Films and Sheeting, Applied Nanoscience, Journal of Nanomaterials, Heliyon, and Macromolecular Materials and Engineering.