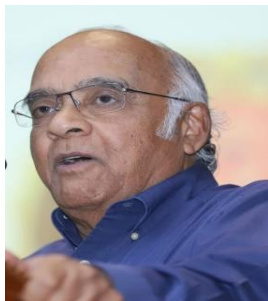


# SMC-Foundation Day Lecture

Organized by

**Society for Materials Chemistry (SMC), C/O Chemistry Division, BARC, Mumbai**



## Professor Swaminathan Sivaram

**INSA Emeritus Scientist at IISER Pune,  
Former Director of NCL, Pune  
Padma Shri Awardee**

**Title: *Transition to low carbon energy : Role of materials and emerging challenges to sustainability***

**Date/Day : 20<sup>th</sup> July 2024, Saturday**  
**Time : 11:00 hrs**  
**Venue : Multipurpose Hall, Training School Hostel, Anushaktinagar, Mumbai**

### Program

<i>About SMC</i>	:	<i>Prof. P. A. Hassan</i>
<i>Introduction of Speaker</i>	:	<i>Prof. A. K. Tyagi</i>
<i>SMC Foundation Day Lecture</i>	:	<i>Prof. S. Sivaram</i>
<i>Vote of thanks</i>	:	<i>Dr. Sandeep Nigam</i>

***All are cordially invited***

**Please join for tea at 10:30h before the lecture**

**Prof. A. K. Tyagi  
President, SMC**

## Abstract

Decarbonizing our current energy resources and progressive transition to low carbon energy technologies is at the core of the global strategy for mitigating the adverse effect of climate change. Decarbonizing the economy is a material-intensive endeavour and also expensive. The tenets of sustainability teach us that before we make critical decisions about our future, we apply “cautionary principle” and think about “unintended consequences”. Human intervention in a complex system tends to create unanticipated and often undesirable outcomes and most technologies have negative consequences that are unpredictable. Therefore, before we introduce new technologies, we need to think of the “*Unintended Consequences*”, which may show up only after several decades. Furthermore, many new solutions, have the potential for causing harm when extensive scientific knowledge on the subject is lacking. In such cases we need to apply “*Cautionary Principles*”, meaning, step back, pause, think and review before jumping into new solutions.

In this lecture, I will focus principally on materials that are critical to the proposed transition to low carbon energy technologies. Building the infrastructure of low carbon energy technologies requires humongous quantity of traditional “dirty” materials. Here lies the conundrum: how to supply enough “old” materials to build the infrastructure of a “new” cleaner economy in a sustainable manner? I will highlight this problem with some specific examples and point out their relevance to India. Key technologies as well as challenges in achieving resource efficiencies of materials through circularity will be discussed. I will also highlight the manner by which we can ward off the “*Rebound Effect*” (or more popularly known as Jevon’s Paradox). Humans in this “complex” adaptive eco-system can control almost nothing, yet, have the power of technology to influence everything. Our responsibility to the future demands that we leave behind well-thought-out solutions that generations yet unborn will not live to regret.

## About the speaker

***Dr. Swaminathan Sivaram is a polymer chemist by profession and a mentor as well as a science manager of distinction. He is a former Director of the CSIR-National Chemical Laboratory, Pune (2002-10), Shanti Swarup Bhatnagar Fellow of CSIR (2010-15) and J. C. Bose Fellow of the Department of Science and Technology (2006-14). Currently, he is a Professor Emeritus and INSA Emeritus Scientist at the Indian Institute of Science Education and Research (IISER), Pune, Honorary Professor at IISER-Kolkata and a Professor of Eminence in Polymer Science at Somaiya Vidyavihar University, Mumbai.***

***Dr. Sivaram was conferred the coveted civilian honor, Padma Shri by the President of India in 2006. He is a recipient of the Gold Medal of the Chemical Research Society of India for his life-time achievements in chemistry (2019) and the International Award for distinguished contributions to polymer science, awarded by the Society of Polymer Science, Japan (2017). The Institute of Polymer Science, University of Akron honored him with the H.A. Morton Distinguished Professorship in 2006. Purdue University conferred on him a degree of Doctor of Science (h. C) in 2010 in recognition of his exceptional merit and attainment. IIT-Kanpur bestowed on him the distinguished alumnus award in 1998. He is an elected Fellow of all the learned academies of science and engineering in India. He is also an elected fellow of The World Academy of Sciences, Trieste, Italy as well as a Fellow of the Royal Society of Chemistry (RSC) and the International Union of Pure and Applied Chemistry (IUPAC).***

***He is a founder Director of AIC-Society for Entrepreneurial Education and Development (2017) and Pune Hydrogen Valley Foundation (2024) and a director on the board of I-HUB Quantum Technology Foundation. Dr. Sivaram is currently leading an industry-academia Thought Leadership Forum on Materials Sustainability, supported by the Royal Society of Chemistry, UK, Tata Trusts and the Department of Science and Technology, Government of India He also Chairs the Steering Committee of the India-UK joint project on "Critical Minerals Observatory" . He has authored close to two hundred and fifty papers in peer-reviewed journals, edited two books and authored one book. He is cited as an inventor in fifty-one issued US and European patents as well as fifty-two Indian patents. He has supervised the doctoral thesis of about forty five students and mentored over fifteen post-doctoral fellows in a research career spanning fifty years.***