National Institute of Technology Rourkela

Departmental Seminar

Seminar Title	: Conference Return Seminar on Carbon Dioxide Capture by Adsorption: Where is the Limit? ; Presented at India-Singapore Bilateral Workshop on Advanced Materials for Energy and Environment (AME2) 24-26 February 2025, IIT Kharagpur, India
Speaker	: Dr. Kshetramohan Sahoo
Supervisor	: 6361641545
Venue	: New Seminar Hall, Chemical Engg. Department
Date and Time	: 12 Mar 2025 (11.00 A.M.)
Abstract	: The continuously rising atmospheric Carbon dioxide (CO2) concentration since the first industrial revolution strongly correlates with the increase in average earth surface temperature. The ‘20 C temperature rise scenario’ envisaged by climate scientists will result in catastrophic climatic change and loss of habitat due to polar ice cap melting. Thermal power plants, steel, and cement industries are major point emitters which contribute to the maximum of around 36 billion tonnes CO2 released to air annually. Post combustion capture of CO2 using adsorption from such sources has been examined over more than a decade. The technique offers us to choose the best adsorbents from a diverse range of solids. However, it has led to thousands of publications every year just by characterizing a new solid, with insignificant progress towards end goal. Well-coordinated systematic studies to arrive at consensus are conspicuous by their absence. The proposed presentation seeks to offer a review of the state of the affair of the adsorption-based strategy in a new way based on fundamental scientific understanding and published literature. The argument is; knowledge of thermodynamic, kinetic, and transport aspect of adsorption of CO2 is at the center of the discovery or invention of efficient adsorbents. Furthermore, the huge volume of adsorbents needed forces us to think about the cost and environmental footprint. Above all, the presentation encapsulates essential information from the school of thoughts rooted in chemical process engineering and selected publications in the field in last two decades.