

Summary of Dr. K.A. Padmanabhan's talk on the eve of NGRI Foundation day celebrations



On the eve of the NGRI Foundation day Celebrations on 11 October 2010, the foundation day lecture was delivered by an eminent scientist and academician, Prof. K.A. Padmanabhan, former Director, IIT Kanpur. The lecture was entitled “Metals and nanomaterials like chewing gum, Air bottles of Titanium, Air gun and continental drift: A common basis for diverse phenomena?”. In his talk, Dr. Padmanabhan took the audience through a fascinating journey of material properties and their behaviours in extreme conditions, both at macro and nano scales, and their useful applications in the modern world. He introduced to the gathering the concepts of super-plasticity and strain hardening citing examples like Titanium alloy. He explained how it is possible to expand sheets of alloys into other shapes, for instance, by controlling temperature gradients. He then narrated the concept of Grain boundary sliding and the importance of grain size in deformation. Dr. Padmanabhan finally made an attempt to connect these concepts to problems in earth sciences, specifically plate boundary problems and earthquake faulting mechanism which could be considered for modeling both the seismic deformation and the aseismic creep in a plate boundary zone. He also commented that as far as Earth system science was concerned, most of the 'experiments' have already been carried out by nature and the major task is to understand them. He said that with proper inputs on the internal structure of the earth, it would be very

interesting to model the plate boundary deformation processes by incorporating material properties with varying pressure and temperature conditions. The talk was followed by a discussion with NGRI scientists on the possible regions of collaboration combining the two fields of Material science and Earth System Science.