



**TIFR Centre for Interdisciplinary Sciences,  
Narsingi, Hyderabad 500075**

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## **Seminar**

### **Structure-Mechanical Behavior in Functional Organic Solids: A Crystal Engineering Approach**

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Mechanical properties of molecular materials have remained relatively unexplored despite their unique applications in optoelectronics, mechanical actuators, pharmaceuticals and explosives. To achieve the high-performance (such as charge transport) in materials it is vital to conserve the orientational order of molecules and bonds in the solid-state, i.e. they need to show excellent mechanical durability, self-healing capabilities and stress dissipating behaviors. In our studies, we showed that both flexibility and crystallinity can be simultaneously achieved in elastically bendable organic single crystals. The structure-property correlation studies reveal that by controlling molecular packing and spatial distribution of noncovalent interactions, the crystal properties, such as mechanical flexibility, mechanochromic luminescence, pharmaceutical tabletability, can be tuned. On the other hand, mechanically flexible, compliant (soft) crystals can also be rationally designed by introducing slip planes using the crystal engineering approach. Our future goal is to apply these ideas to achieve both flexibility and high percentage of crystallinity in synthetic and biopolymeric materials, for example for realizing high conductivity or efficient stress dissipation in them.

***Tuesday, Feb 4<sup>th</sup> 2014***

***11:30 AM (Tea/Coffee at 11:15 AM)***

***Seminar Hall, TCIS***