הטכניון - מכון טכנולוגי לישראל

TECHNION - ISRAEL INSTITUTE OF TECHNOLOGY

הפקולטה להנדסה כימית
ע״ש וולפסון
The Wolfson Department of Chemical Engineering

Wolfson Department of Chemical Engineering Seminar
Lecture Hall 6, Wolfson Department of Chemical Engineering,
Wednesday, January 8th, 2020 at 13:30

Stopping Crystal Growth in its Tracks: Preventing Disease and Other Crystal Mysteries

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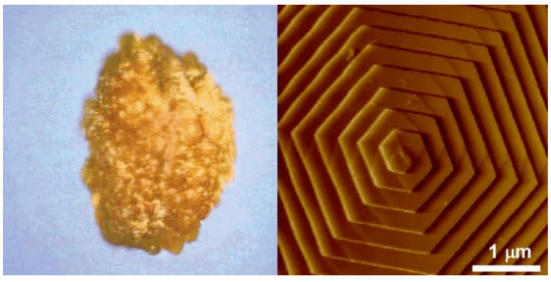
The crystal growth of conventional materials, such as silicon, has been refined for decades and has led to textbook crystal growth models. Confidence in these models quickly evaporates when considering complex inorganic solids and molecular crystals, however, despite the importance of these materials to technology, biology, and human health. In particular, many crystalline materials are associated with diseases, from malaria to kidney stones. This presentation will illustrate the beauty and complexity of crystal growth, through mechanisms often hidden and deceptive, of pathological molecular crystals, including kidney stones as well as “xenostones” that form as a consequence of active pharmaceutical ingredients that form crystals in renal spaces. Observation at multiple length scales, using techniques ranging from atomic force microscopy (AFM) to optical microscopy, reveal the consequences of the complexity of dissymmetric surfaces of organic crystals, which stems from their inherent low molecular and crystal symmetry. Armed with an understanding of crystal physics and crystal surface structure at the molecular level, crystal growth inhibitors can be designed that bind to specific crystal sites and prevent the formation of pathological crystals, suggesting a pathway to therapies for crystal-based diseases in general. Moreover, real-time in situ AFM permits kinetic analyses of crystal growth at the nanoscale that reveals the mode of action of crystal growth inhibitors in knockout mouse models.



Refreshments will be served at 13:15