平成25年度

総合研究機構　界面科学研究部門　セミナー

この度、以下の日程で Technion-Israel Institute of Technology から Yeshayahu Talmon 教授をお招きして、講演会を開催させて頂くことになりました。Talmon 教授は低温凍結型電子顕微鏡観察の第一人者で、この手法を用いることで分子集合体に関する現象理解を精力的に進めていらっしゃいます。万障お繰り合わせの上、ご参加下さいますと幸いです。

記

日時:	平成25年10月30日（水）　15時　～　16時30分
場所:	野田校舎　総合研究機構ホール（3号館4階）
講演者:	Prof. Yeshayahu Talmon (Technion-Israel Institute of Technology)
講演タイトル:	“The Latest in Cryo-EM”
連絡先:	総研　酒井健一（野田 5059）・ 理工工化　酒井秀樹

以上

The Latest in Cryo-EM

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Cryogenic-temperature transmission electron microscopy (cryo-TEM) is now accepted as an almost standard tool in the study of complex liquids, i.e., liquid systems with aggregates or building blocks on the nanometric scale. Methodologies have been developed to help capture the nanostructure of liquid systems, while preserving their original state at a given concentration and temperature. Cryo-TEM is now widely used to study synthetic, biological, and medical systems. Originally developed for aqueous systems, it has been also applied successfully in the study of non-aqueous systems, even in unusual solvents, such as strong acids. Recently the methodology has also been extended to oil-water systems such as microemulsions. However, this methodology cannot be used to study highly viscous systems, or those containing objects larger than several hundreds of nanometers.

Recent developments in high-resolution scanning electron microscopy (HR-SEM) have made it an ideal tool for the study of nanoparticles and colloids in viscous systems or in systems containing large objects, hundreds of nanometers and larger, in which small (nanometric) features are to be imaged, e.g., hydrogels or biological cells. Improved field-emission electron guns, electron optics and detectors have made it possible to image nanoparticles down to a few nanometers. Liquid nanostructured systems can now be studied by cryo-SEM, using much-improved cryogenic specimen holders and transfer systems, even without conductive coating. In recent years we have developed a novel specimen preparation methodology for cryo-SEM specimens that preserves the original nanostructure of labile complex liquids at specified composition and temperature, quite similarly to what had been done in cryo-TEM.

In my talk I will describe briefly the state-of-the-technology of cryo-TEM and cryo-SEM, and demonstrate the application of our methodologies in nano- and biotechnology. Among others I will describe applications in the study of microemulsions, liotropic liquid crystals, blood microparticles, carbon nanotubes in chlorosulfonic acid, and entire cells.