

MSE-Colloquium@NTU

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Nanomaterials for functional and 3D printing: from basic science to applications

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About the Talk

Nanomaterials have unique properties which enables their utilization in functional printing and coatings. Our research is focused on synthesis and formulations of nanomaterials and utilization of these materials as “inks” and “paints” for functional coatings and printing, for a variety of applications such as thermosolar power, 2D and 3D printed electronics. For printed electronics, the formation and application of conductive inkjet inks composed of silver, copper, copper@silver and carbon nanotubes will be reported. Recent discoveries of several routes for achieving high conductivity even at room temperature, which is important for plastics electronics will be discussed. These methods are based on various concepts of colloid and interface science, such as coalescence and wetting processes that are observed in “coffee ring effect”. While combining the low sintering temperatures concepts with self assembly processes, transparent conductive plastic films are fabricated, and are applied in optoelectronic devices (such as for smartphones) and 3D conductive structures. Demonstrations will be presented for fabrication of inkjet printed solar cells, touch screens, light sensors, plastic electroluminescent devices, smart windows, and 4D printed devices. Also to be discussed possible routes for converting a scientific idea into an industrial product.

About the Speaker

Professor Shlomo Magdassi is a professor of chemistry, at the Casali Center for Applied Chemistry, the Institute of Chemistry and the Center for Nanoscience and Nanotechnology at the Hebrew University of Jerusalem, Israel. His research focuses on colloid science, and in particular on formation, formulation and applications of novel micro and nanoparticles. These particles can be used as active components in functional inks and coating, for example metal nanoparticles and CNT for solar devices, 2D and 3D printing. In addition to his scientific publications, he also has various inventions on applications of colloids in industrial products. Based on these inventions, some commercial activities evolved leading to worldwide sales and establishing new companies.