

Nanomaterials for functional and 3D printing

Shlomo Magdassi

*Casali Center for Applied Chemistry, Institute of Chemistry
The Hebrew University of Jerusalem, 91904 Jerusalem, Israel*

magdassi@mail.huji.ac.il

Our research is mainly focused on synthesis and formulations of nanomaterials, and their utilization as “inks” and “paints” in functional coatings and printing for a variety of applications such as thermosolar power plants and printed electronics. Recent discoveries of several routes for achieving high electrical conductivity of printed metal nanoparticles even at room temperature, which is important for plastics electronics will be discussed. These routes are based on various concepts of colloid and interface chemistry, 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 were formed, and demonstrated in printed optoelectronic devices such as electroluminescent films and smart windows. Recent developments of new materials will be presented, for 3D and 4D printing, including printed hydrogels, shape memory polymers and utilization in soft robotics.