

Additive Manufacturing: the next industrial revolution

Shlomo Magdassi

The Hebrew University of Jerusalem, Institute of Chemistry, Jerusalem, Israel
Magdassi@mail.huji.ac.il

Abstract

Additive manufacturing which is based on printing processes, is considered as the next industrial revolution. Functional printing brings additional performance of printed patterns, beyond the conventional graphic output. The synthesis and formulations of nanomaterials and inks will be presented, with their utilization in printed devices, responsive and 3D objects. New approaches for achieving conductive inks for printed plastic electronics will be presented, as well as new materials and processes for 3D and 4D printing. Utilization of 3D and 4D printing technologies for fabrication of objects composed of ceramics, shape memory polymers, elastomers and hydrogels will be demonstrated, for applications such as soft robotics, drug delivery systems, responsive connectors and Internet of Things (IoT), dynamic jewellery and medical devices.

REFERENCES

1. E. Shukrun, I. Cooperstein, 3D printed organic-ceramic complex hybrid structures with high silica content, *Advanced Science*, 2018, 1800061,
2. D. Kam, M. Layani, S. Barkai Minerbi, D. Orbaum, S. Abrahami Ben Harush, O. Shoseyov, S. Magdassi, Additive manufacturing of 3D structures composed of wood materials, *Advanced Materials Technology*, 2019, 4
3. T. Rosental and S. Magdassi, A new approach to 3D printing dense ceramics by ceramic precursor binders, *Adv. Eng. Mater.* 2019, 1900604
4. O. Halevi, T.Y. Chen, P.S. Lee, f S. Magdassi, J.A. Hriljac, Nuclear wastewater decontamination by 3D Printed hierarchical zeolite monoliths, *RSC Advances*, 2020, 10, 5766 – 5776.
5. E. Sachyani-Keneth, R. Lieberman, M. Rednor, G. Scalet, F. Auricchio, S. Magdassi, Multi-material 3D printed shape memory polymer with tunable melting and transition-temperature activated by heat and light, *Polymers*, 12, 710, (2020)
6. I. Cooperstein, S.R.K. C. Indukuri, A. Bouketov, U. Levy, and S. Magdassi, 3D Printing of Micron-Sized Transparent Ceramics with Optical Gain on Demand Properties, *Adv. Mater.* 2020, 2001675,