

## **New organic – inorganic hybrid materials as possible replacement for lead perovskites at photovoltaic applications**

**G. Mousdis, A. Ioannou,**

National Hellenic Research Foundation Theoretical and Physical Chemistry Institute.  
Vass. Constantinou Ave., 48 116-35 Athens Greece E-mail: [gmousdis@eie.gr](mailto:gmousdis@eie.gr)

Since the initial reports on solid-state perovskite solar cells (PVSCs) with efficiency of 3.8% in 2009, there has been a rapid increase in the reported efficiencies. The latest certified record efficiency now exceeds 22%. The PVSCs aim to increase the efficiency and lower the cost of solar energy. PVSCs indeed hold promises for high efficiencies as well as, reduced processing costs. A big advantage of the PVSCs over conventional solar technology is that they can react to a wide range of wavelengths of light, which allows them to convert more of the sunlight that reaches them into electricity. Moreover, they offer flexibility, semi-transparency, tailored form factors, light-weight devices etc.

Although the magnificent progress that has been done for the PVSCs to validate their commercial relevance, a number of problems ranging from fundamental to practical still remain and must be overcome. The most important are: a) The chemical instability towards water, oxygen and radiation and b) The toxicity of the lead.

In order to solve these problems new materials were investigated based on other metals. Although the efficiency of PCS based on these materials is still low, there are hopes that by using molecular design and film preparing techniques we will achieve efficiencies similar to those of lead perovskites and even higher.

This work is supported by The ERANET-MED-ENERG-11-132 project: “HYDROSOL”. by the “Greek General Secretariat of Research and Technology” (MIS T3EPA-00029) which is implemented under the “European R & D Collaboration - Granting Operation of Greek Bodies Successfully in Common Notice For Proposals Of The European Networks Era-Net” funded by the Operational Programme "Competitiveness, Entrepreneurship and Innovation" (NSRF 2014-2020) and co-financed by Greece and the European Union (European Regional Development Fund).

