ΠΑΝΕΠΙΣΤΗΜΙΟ ΚΡΗΤΗΣ
ΤΜΗΜΑ ΕΠΙΣΤΗΜΗΣ ΚΑΙ ΤΕΧΝΟΛΟΓΙΑΣ ΥΛΙΚΩΝ

ΠΑΡΟΥΣΙΑΣΗ ΔΙΠΛΩΜΑΤΟΣ ΜΕΤΑΠΤΥΧΙΑΚΩΝ ΣΠΟΥΔΩΝ

Τίτλος

«Laser-induced interactions with all-inorganic metal halide nanocrystals»

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Επιβλέπων: Εμμανουήλ Στρατάκης

Παρασκευή 16/04/2021

09:30

Η παρουσίαση θα πραγματοποιηθεί μέσω τηλεδιάσκεψης σύμφωνα με το άρθρο τρίτο, παρ. 1 της με αριθμ. 115744/Z1/4.9.2020 Κοινής Υπουργικής Απόφασης (Β΄3707), στον παρακάτω σύνδεσμο:

https://virtconf.materials.uoc.gr/b/sta-acb-rmr-nxl

ABSTRACT

Inorganic semiconducting nanocrystals are unique materials, exhibiting optoelectronic properties that are size- and shape- dependent. Their unique properties together with their easy colloidal synthesis render them efficient nanoscale functional components for multiple applications ranging from photodetectors to solar energy conversion and bioimaging. So far, the most studied semiconducting nanocrystals prepared with colloidal methods have been fabricated from metal chalcogenides. However, over the last years, semiconducting nanocrystals of lead halide perovskite in different morphologies and structures have shown to possess promising shape-dependent properties. The metal

halide nanocrystals have the formula ABX3, where the cation ‘A’ occupies the corner positions of the unit cell, cation ‘B’ is situated at the center of the cell and anion ‘X’ (X= F, Cl, Br and I) is located at the unit cell faces. The metal halide perovskite nanocrystals are a new class of nanomaterials, which their properties can be tuned by modifying the halide component or by altering the dimensionality or the morphology of them. Till to date, these modifications can be done only by chemical method. According to these lines, this Master thesis will aim to fabricate new and novel perovskite-based nanostructures of interesting morphologies and structures for specific applications by using wet chemical methods. Then, laser-induced processes will be used to modify their structure, crystallinity, and morphology according to these needs. This is the first time that laser-assisted processes will be used for such modifications. Similar processes will be also utilized to combine two different materials to obtain synergetic functionality. The morphological/structural features as well as size dispersity of these nanocrystals (before and after irradiation) will be characterized by transmission electron microscopy (TEM), X-Ray Diffraction (XRD), Raman Spectroscopy and Energy Dispersive Spectroscopy (EDS). Their optical properties will be evaluated by UV-Vis and PL spectroscopies.