ΠΑΝΕΠΙΣΤΗΜΙΟ ΚΡΗΤΗΣ
ΤΜΗΜΑ ΕΠΙΣΤΗΜΗΣ ΚΑΙ ΤΕΧΝΟΛΟΓΙΑΣ ΥΛΙΚΩΝ

ΠΑΡΟΥΣΙΑΣΗ ΜΕΤΑΠΤΥΧΙΑΚΟΥ ΔΙΠΛΩΜΑΤΟΣ ΕΙΔΙΚΕΥΣΗΣ

Τίτλος

«Πολυμερικά μεταϋλικά για εφαρμογές ηλεκτρομαγνητισμού, εκτυπωμένα στις 3 διαστάσεις»

«3D printed metamaterials for electromagnetic applications»

Δέσποινα Μεντζάκη

Μεταπτυχιακή Φοιτήτρια

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Επιβλέπουσα καθηγήτρια κ. Μαρία Καφεσάκη

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Κτίριο Τμήματος Χημείας,
Πανεπιστήμιο Κρήτης

ABSTRACT

The last decade metamaterials have attracted intensive research interest from engineers and physicists due to their unique response to electromagnetic radiation, as well as their potential applications in perfect lens, cloaking and so on. The metamaterials are conventionally fabricated using printed circuit board processes and microfabrication techniques, such as Photolithography, Imprint Lithography etc. These techniques require qualified staff and fabrication facilities which are expensive to own and maintain. In this work, we report a cost-effective and eco-friendly method for fabricating three-dimensional microwave metamaterials by fused deposition modeling (FDM) 3D printing. We demonstrate with transmission measurements and corresponding simulations that conductive 3D structures, which act as electrical circuits, can be fabricated either by combining polymer 3D printing with metallization or by the 3D printing of a commercial available highly conductive filament. Finally, we provide evidence that the fabricated 3D

structures could be efficient for potential sensing applications. Consequently, a novel alternative method for fabricating metamaterials in the range of millimeter, suitable for practical real-life applications, is proposed.