

UNIVERSITÀ DELLA CALABRIA



XXV Congresso Nazionale della Società Chimica Italiana

Arcavacata di Rende
07-12 Settembre 2014

ATTI DEL CONGRESSO

XXV Congresso Nazionale
della Società Chimica Italiana

Università della Calabria
Via Pietro Bucci
87036 Rende (CS), Italy

Arcavacata di Rende
07-12 Settembre 2014

Effect of methacrylic acid on the structure of Eu:YAG-PMMA composites

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Polymeric composites of lanthanide-doped materials were recently considered as potential candidates for the development of light emitting diodes, lasers and luminescent concentrators for solar cells. In particular, nanoparticles of yttrium aluminum garnet (YAG) doped with cerium ions embedded in polymethylmethacrylate (PMMA) have been valuable for white LED devices [1,2].

Different structures and micromechanical properties have been observed when the methacrylic acid (MAA) is present in the composite.

With the aim to understand the effect of MAA on the composite structure, a series of Eu:YAG composites prepared by in situ polymerization starting from mixtures of MAA and methylmethacrylate (MMA) were investigated.

The structure were investigated by using Small Angle X-ray Scattering, X-ray Diffraction, and ¹³C Cross-Polarization Magic-Angle Spinning NMR. The last technique gave information also about the interactions between the components. Results will be presented and discussed.

[1] M.L. Saladino, A. Zanutto, D. Chillura Martino, A. Spinella, G. Nasillo, E. Caponetti, *Langmuir* 2010, **26(16)**, 13442–13449.

[2] M.L. Saladino, D. Chillura Martino, M.A. Floriano, D. Hreniak, L. Marciniak, W. Stręk, E. Caponetti, *The Journal of Physical Chemistry C*, 2014 doi:10.1021/jp412173g.