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# Properties of laser induced plasmas on magnetic materials

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***Abstract***

A Cobalt ferrite thin films with preferential crystallographic structure, controlled composition and perpendicular magnetic anisotropy can be obtained by pulsed laser deposition. Their properties are influenced by the experimental conditions and thus by the plume characteristics. The analysis of the laser induced plasma can help explain the structural and chemical properties of the deposited nano-structured materials and also optimize the deposition process itself.

The aim of this study was to obtain information on the dynamics and properties of the expanding plasma generated by laser irradiation (Nd-YAG: 532 nm, 10 ns, 10 Hz) of a cobalt ferrite target. This was done through space- and time-resolved optical emission spectroscopy using an ICCD camera (PI-MAX3) and a monochromator (Acton SP2750). Both the global dynamics of the plasma and the evolution of individual species were analysed. To have an insight on the contribution of each element, plasma plume analysis of pure cobalt and iron targets were performed in the same conditions as the spinel magnetic material. The laser fluence (5 J/cm2) and gas pressure (10-3Torr) during the experiments were similar to the ones used for the deposition of thin films. From the space- and time-evolution of several spectral lines, we determined the velocities of the main plasma plume constituents. The excitation temperature distributions were obtained from the Boltzmann plot, in the assumption of local thermodynamic equilibrium. For a more accurate correlation, the same spectral lines analysed for the pure Fe(/Co) plasma were then considered when studying the cobalt ferrite plume.

***Biography:***

Georgiana BULAI has completed her PhD at the age of 27 years from "Alexandru Ioan Cuza" University of Iasi and postdoctoral studies from same institution. She participated as a member in 7 national projects. He has published 30 papers in Web of Science indexed journals.

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