Journal of
Electrical Engineering and Electronic Technology

Abstract

Laser ablation of Mg metal target under copper vapor laser in acetone liquid medium

ABRINAEI F

Department of Physics, East Tehran Branch, Islamic Azad University, Tehran, Iran

Abstract:

A homemade copper vapor laser (CVL) operating at 510 nm (green) and 578 nm (yellow) outputs, was applied to vaporize the Mg metal target in the acetone liquid medium. The Mg plate surface was ablated under a 10 kHz repetition rate and maximum pulse energy of 3 mJ and 35 ns pulse duration. Structural, morphological, optical, and chemical-bond properties of synthesized Mg and MgO nanoparticles were investigated using the X-ray diffraction (XRD) analysis, scanning electron microscopy (SEM) observations, UV-VIS absorption spectroscopy and Fourier transform infrared spectroscopy (FTIR) analysis, respectively. The XRD results confirmed the formation of both Mg and MgO structures. The crystallite size and the strain of final powder were estimated about 57 nm and 0.017 from XRD data calculated using the Williamson-Hall method. The Mg/MgO ratio was also calculated to be about 67% according to Alexander & Klug formula. The chemical bands of products were correctly identified using the FTIR characterization. The SEM images revealed the presence of spherical and platelet-like structures in a range of 50- 80 nm in diameter that confirmed the XRD results. UV-VIS absorption spectrum of Mg/MgO nanoparticles synthesized by laser ablation of Mg target in acetone shows a broad peak at about 417 nm attributed to the plasmon absorption band at this wavelength. The derivative method was applied to measure the Eg equal to 2.3 eV for Mg/MgO structures synthesized in acetone medium under CVL ablation.

Biography:

Fahimeh Abrinaei has completed his PhD at the age of 29 years from Plasma Physics Research Center of Islamic Azad University. She is currently an Associate Professor at East Tehran Branch of Islamic Azad University. She has published more than 20 papers in reputed journals. Her fields of work include Laser materials processing, Materials science, Nonlinear optics, and Nanomaterials in tribology science.

Recent Publications:

- 1.Effect of Laser Energy on the Tribology Properties of MoS2 Flakes Tribology in Industry
- 2. Preparation of Few-Layered Wide Bandgap MoS2 with Nanometer Lateral Dimensions by Applying Laser Irradiation
- 3. Hydrothermal synthesis of hematite-GO nanocomposites at different GO contents and potential application in nonlinear optics, Optical Materials

15th International Conference on Laser Advanced Materials Processing , June 22-23, 2020, Osaka, Japan

Citation: ABRINAEI F, Laser ablation of Mg metal target under copper vapor laser in acetone liquid medium, , June 22-23, 2020, Osaka, Japan