

Depth Analyses of Multilayer Thin Films Using Laser-Induced Breakdown Spectroscopy

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Abstract

LIBS is an atomic emission spectroscopy technique providing qualitative and quantitative information about elemental composition of material. LIBS is a nondestructive, high speed, high sensitive analyses method and no need sample preparation for solid, liquid and gaseous samples analysis. In recent years, thin film technologies are used in many applications such as, reflective/antireflective coatings, semiconductor devices, gas/liquid sensors, protection against oxidation or corrosion etc. Thin films are grown as single layer or multi layers by the PVD, CVD, PLD, sol gel, spin coating and sputter techniques. LIBS technique has great potential for depth profiling of industrial, archaeological and thin film materials [1,2]. In this work, application of LIBS to determine depth of multilayer thin film produced by Magnetic sputtering and PLD was investigated. In the experiments, 4,4 ns pulsed Nd-YAG laser coupled with one channel high resolved BAKI-LIBS spectrometer system (see Figure) in the wavelength range of from 200 nm to 700 nm is used for analysis of multi layer thin film containing Al and Ti elements on the glass substrate. The thickness measurements in the order of nm resolution are achieved in the LIBS analysis of multi layer thin film

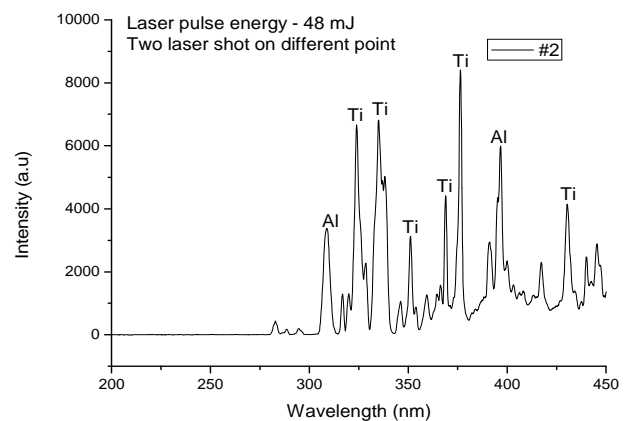
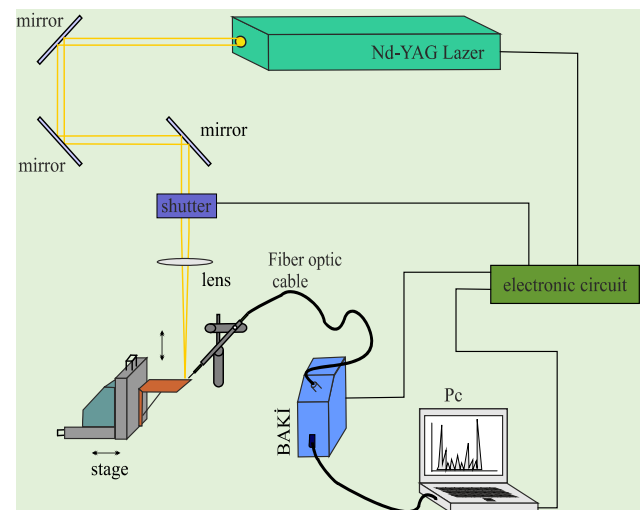


Fig. 1: Schematic of LIBS system and spectrum

References

- [1] B.Genc Oztoprak et al, *Laser welding of copper with stellite 6 powder and investigation using LIBS technique*, Optics & Laser Technology **45** 748-755 (2013)