

Scanning Optical Coherence Tomography Applied to the Characterization of Surfaces and Coatings

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Abstract

This paper shows the technique of optical coherence tomography in the frequency domain (OCT-FD) to obtain surface topography and tomography of surface coatings. The setup is based on a superluminescent diode centered on 849 nm with an spectral wide of 50 nm as the light source, a single-mode fibre Michelson interferometer and a spectrometer as the detector system. This scheme allows having compact and robust equipments that was designed to be used in an industrial environment. With this system it can be obtain a tridimensional image acquired point by point with a maximum range of 20 mm width and length and 2 mm depth. Images obtained from the topography of metal samples and tomography of polymer based coatings is presented. Also it is shown that is possible to obtain, from these images, parameters of interest of the sample, such as roughness, flatness and characteristic distances. As an example to show the potential of the method the dimensions of a metal surface modified after laser ablation were measured from a topography image obtained with this technique. A second example presented was the image obtained of a roughness pattern made on a metal surface. Finally it was presented a tomography image of a modified polyurethane coating deposited on a metal surface. Thickness and refractive index of the coating were obtained after the image analysis.

Keywords

Low Coherence

Surfaces Characterization

OCT

Profilometry.