

Photothermal Depth Profiling of Optical Material Properties by a Neural Network Approach

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In photothermal techniques excitation light is absorbed by the sample, and the temperature variation at the surface, resulting from diffusing generated heat, is detected, e.g. by infrared radiometry or photopyroelectric spectroscopy. Since heat generated at different depths reaches the surface with a different delay, information about the heat source profile, and thus about the optical absorption profile, is in the time or frequency dependence of the temperature signal. In this paper we study the feasibility of using neural network analysis of photothermal data to determine the depth profile of the optical absorption coefficient in the neighbourhood of the surface of materials. The method can be applied for the depth profiling of pigment and chemical composition in biological and technological materials.