



Feasibility Study and Optimal Design of an Experimental Bench for Identification of Liquid Thermal Diffusivity

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Résumé en anglais	Expertise of innovative materials by nondestructive techniques is a key goal in process engineering development. In this context, if identification of thermal diffusivity of liquid is a crucial requirement to develop a reliable mathematical model of knowledge, it is essential to propose a complete and valid methodology. Based on the analysis of thermal wave propagation (generated by a periodic excitation), an experimentation is developed in order to avoid the implementation of a pyroelectric sensor required in usual photopyroelectric techniques. The proposed approach is investigated in a trilayer system. Theoretical aspects of the identification of thermal parameters in the frequency domain are presented. A feasibility study is discussed in order to justify this approach for liquids. A sensitivity analysis is implemented in a particular case to provide an optimal experimental bench. Finally, experimental results for several liquids are presented and discussed.
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