Measurements of the PMMA by Pulse Transient Method: Methodology for the Determination of the Thermophysical Parameters including the Heat Transfer Coefficient

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Recently a new class of the measurement methods named contact transient methods started to be used in technology. The methods are efficient for study of the thermophysical properties (specific heat, thermal diffusivity and thermal conductivity) of a broad range of materials in both the equilibrium as well as in the non-equilibrium states using appropriate measuring regime. The contribution concentrates on the application of the contact pulse transient method for determination of the specific heat, thermal diffusivity, thermal conductivity of the PMMA and the heat transfer coefficient from the specimen surface. The PMMA is a candidate for the CRM (certified reference material). Details of the pulse transient method, its methodology and instrumentation will be elucidated. Ideal model considering non-limited specimen and a model considering limited shape of the specimen will be analyzed. Heat pulse width and the heat transfer coefficient from the specimen surface will be included into analysis. The analysis gives an interval of the temperature response (time window) in which data evaluation can be performed. Time window considering sensitivity coefficients will be studied when measurements in the temperature range from -40 ^{o}C up to 60 ^{o}C is performed. The goal of the presentation is the intercomparison of the ideal model with the real one considering size of the time window, and the variations of the heat transfer coefficient in the above mentioned temperature range. Uncertainty budget for all parameters will be given. Comments on reliability of the PMMA as a CRM will be added.