## Optical Scanning Instrument for Measurements of Thermal Properties of Solids with Flexible Parameters of Measurement Regime

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A new optical scanning instrument was developed this year to provide non-contact non-destructive measurements of thermal conductivity (TC) and volumetric heat capacity (VHC) of consolidated rock and other solids. A continuous operation laser as a local heater and special infrared sensors to determine excessive temperatures in three points on the solid surface are used. A heating area and fields of view of infrared sensors are fixed in their combination that is flexible and move on the solid surface along a scanning line with the same stable velocity. The instrument allows determination of the TC and VHC values and to record continuous profiles of these thermal properties for heterogeneous solids along the scanning line simultaneously in one experiment. The principal TC components of anisotropic solids can be determined if angles between a scanning direction and principal TC axes are known. Directions of the principal TC axes can be established from several measurements. Principal peculiarities of the new instrument include possibilities (1) to change mutual configuration of the heating spot and fields of view of infrared sensors just before every experiment, (2) to vary heating spot dimensions and the scanning velocity, (3) to vary the spatial resolution of thermal heterogeneity recording, thickness and width of the solid zone that is studied in the experiment, and (4) to adjust the measuring regime parameters according to solid dimensions. Special software developed and the instrument peculiarities mentioned above provide measurement quality control and possibility to predetermine necessary measuring regime parameters depending on form and dimensions of the solids studied, measurement rate, allowed maximum temperature of the solid studied, measurement accuracy and precision. Noncontact principle of the measurements and possibilities to adjust the measuring regime parameters for every experiment provide a measurement result uncertainty not more than 3.5 % for TC and 5 % for VHC.