**THERMAL DIFFUSIVITY AND HEAT CAPACITY MEASUREMENTS OF SANDSTONE AT HIGH TEMPERATURES USING LASER FLASH AND DSC METHODS**

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The well – known contact-free flash method and DSC were used for measurement of the thermal diffusivity and heat capacity of natural sandstone sample from Australian. The experimental procedure has been conducted in micro-flash apparatus (model LFA 457 MicroFlash, NETZSCH) and DSC (model 204 F1 Phoenix). The thermal diffusivity measurements has been made over the temperature range from (302.9 to 774.25) K. Isobaric heat capacity of the same sample have been measured in the temperature range from (308 to 763) K. The expanded uncertainty of the thermal diffusivity and heat capacity measurements at the 95 % confidence level with a coverage factor of *k* = 2 are estimated to be 3 % and 1 %, respectively. A good agreement is found between the experimental results obtained and the thermal diffusivity predicted from various theoretical and empirical models. Theoretically based correlations were adopted to represent measured thermal diffusivities and heat capacities in the high and low temperature limits (asymptotic). The wide ranged correlation equations for thermal diffusivity and heat capacity of sandstone have been developed. The measured thermal diffusivities and heat capacities are well represented by theoretically based equations containing a few parameters. The correlations are applicable for the whole measured temperature range from room temperature to 775 K. The measured values of the thermal diffusivity and heat capacity together with density data were used to calculated thermal conductivity of the sandstone sample, . A rapid decrease of the measured thermal diffusivities in the low temperature range was observed, as expected by theory and in agreement with previous studies for rock materials and single crystals. At high temperatures the thermal diffusivity is trend to constant (small rate of temperature changes has been observed), *i.e.*, the saturation state is reached. The flat trend (saturation) in ** at high temperatures has been observed. The temperature coefficient of thermal diffusivity ** changes from -0.0044 K-1 to -0.0013K-1, whilechanges from -0.00221 K-1 to -0.00073 K-1. In the experimental temperature range from (303 to 774) K the thermal diffusivity of the sandstone decreases by 40 %. We examined the applicability various theoretically based models and their accuracy to represent and predict the thermal diffusivity and heat capacity of sandstone.