Recent Developments in Dynamic Emissivity Measurements above 1000 K at PTB

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A precise knowledge of thermophysical properties is a key factor for the development of materials for high temperature applications. Especially the emissivity becomes increasingly important for high-accuracy radiation thermometry and the modelling of radiative heat transfer at elevated temperatures above 1000 K where heat losses are dominated by radiation. Therefore, dynamic emissivity measurements above 1000 K were further improved at PTB. The measurement principle is based on the laser flash method, which is a well-established method for determining the thermal diffusivity. In order to determine the spectral emissivity at the laser wavelength of 1064 nm, the setup has been modified to measure *in situ* the absolute laser energy which is heating the sample and the subsequent absolute temperature rise. To avoid interreflections between the hot furnace walls and the sample, the existing conventional tube furnace was replaced by an inductive heating system. This allows conductive samples to be heated in a cold environment. Under this condition of reduced background radiation, the spectrally resolved emissivity can now be measured by a characterized array spectrometer in the spectral range of 500 nm to 1100 nm. A variation of the measurement principle allows us to determine the specific heat capacity of a sample above 1000 K if the emissivity is known. This can be realized by using for example graphite coated samples. The recent developments and the improved measurement setup will be explained and first results will be shown.