RESEARCH AND DEVELOPMENT OF PHASE TRANSITION TEMPERATURE REFERENCE MATERIAL FOR MEASURING INSTRUMENTS IMPLEMENTING THERMAL ANALYSIS METHODS METROLOGICAL SUPPORT

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Thermal analysis (TA) is a group of methods in which the physical properties of a substance are measured as a function of temperature or time while the substance is subjected to a program of controlled temperature changes. The most common methods are differential thermal analysis (DTA) and differential scanning calorimetry (DSC) [1], the detailed classification of the main methods is given in [2]. In addition to the above methods, others are being developed [3]. In turn, achieving the required metrological characteristics of TA devices is impossible without providing them with reference material (RM).

More than 100 types of measuring instruments (MI) TA have been entered into the state register of MI. The temperature range (TR) of MI is from minus 150 °C to plus 2000 °C. Until recently (2022), the list of RM for metrological support of the above SI consisted of 6 types of RM, covering TR from plus 30 °C to plus 770 °C. At UNIIM - a branch of the FSUE "VNIIM named after D. I. Mendeleyev" continues research and development of phase transition temperature RM for metrological support of MI implementing TA methods. Currently, the list of RM comprises 23 types and covers TR from plus 30 °C to plus 1600 °C. Future developments include expanding of the TR (from minus 150 °C to plus 1800 °C), expanding the range of RM compatibility with various crucible types, and increasing the accuracy of approximation during calibration of MI TA.

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