Experimental study of thermal diffusivity of Inconel 625 alloy at higher temperatures

Robert SMUSZ

Abstract. This paper presents the results of experimental studies of the thermal diffusivity of Inconel 625 alloy at elevated temperatures. This research is part of the FAME (Fuel cell propulsion system for Aircraft Megawatt Engines) project, which is developing a thermal control system for a hydrogen-powered aircraft. Inconel 625 (UNS N06625) is a versatile nickel-chromium-molybdenum superalloy known for its exceptional strength and corrosion resistance over a wide temperature range. It is used in applications such as the aerospace industry for aircraft exhaust systems, fuel and hydraulic lines, and turbine casings; in the chemical industry for reactor vessels, heat exchangers, and distillation columns; and in the nuclear industry for reactor core and control rod components. This paper presents the results of thermal diffusivity measurements of Inconel 625 alloy over a temperature range of 600°C to 1000°C. Thermal diffusivity was measured using the laser flash method using a NETZSCH LFA 427 device. The final result of the study was the determination of changes in thermal diffusivity of the analyzed material as a function of temperature.