A New FT-IR Spectrometer Based Micro-Emissometer

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A new micro-emissometer has been conceived to allow the characterization of the emissivity of micrometric samples' sectors; it will particularly permit resolving different emissivity values of heterogeneous samples, and performing IR mapping. To do so, a 10 mm diameter sample holder including a micrometric cylindrical (*f* = 0.5 mm) blackbody furnace has been designed, and the whole system is heated up using a Linkam temperature controlled stage which allows achieving temperatures up to 1500 °C in vacuum or controlled atmosphere. The design of the setup includes a Bruker Hyperion microscope coupled to a Vertex80v FT-IR spectrometer that allows the acquisition of IR signals coming from 50x50 µm squared samples' area. A nitrogen-cooled Mercury-Cadmium-Telluride (MCT) detector allows measuring in the 500-8000 cm^{-1} spectral IR domain. The measurement method includes the acquisition of three IR signals coming from sample, blackbody, and environmental surroundings. Validation of the system has been performed by comparison of emissivity of alumina (Al_2O_3), zirconia (ZrO_2), and silica (SiO_2) obtained by using the new set-up and a classical radiometric direct emissivity measurement apparatus [1].

References:

[1] D. De Sousa Meneses et al.; Infrared Phys Technol; 69 (2015) 96-101