

The development of a novel apparatus to measure the emissivity of high-roughness materials at 82 K

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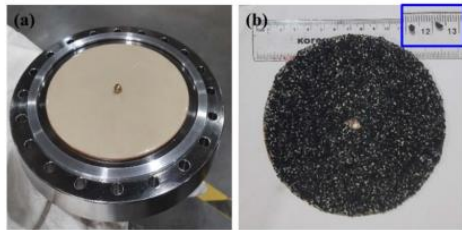
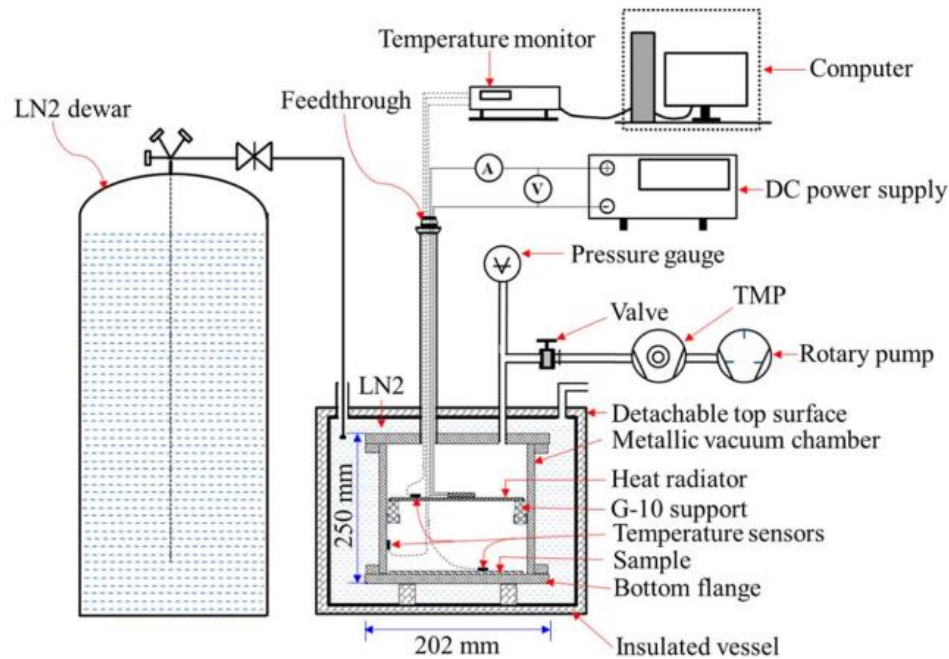


Figure: A complete schematic diagram of the emissivity measurement system and the samples.

The knowledge of emissivity plays an important role in the estimation of radiation heat load in cryogenic systems. In the present work, an apparatus is developed based on a calorimetric technique for measuring the emissivity of an opaque material around 82 K. The novelties of the apparatus are its compact size, ease of sample handling, shorter time required to reach thermal equilibrium and, most importantly, capacity to measure the emissivity of a sample of high roughness. The emissivity of indigenously developed novel materials, such as black paint (flat, & matte-finished), adhesive, activated charcoal with small grains, large grains and mixed grains are measured.