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The extreme conditions catalytic cell for BL01 at ALBA

Tuesday 16 September 2025 17:00 (1 hour)

A new catalytic cell has been developed for the Infrared Spectroscopy and Microscopy (MIRAS-BL01) beamline at the ALBA synchrotron. The aim of this instrument is to study catalytic reactions, crucial for advancing sustainable chemistry by enabling energy-efficient processes and minimizing by-products. Infrared (IR) spectroscopy offers key molecular insights, helping identify active species, understand mechanisms and link structure to activity. It also monitors catalysts in real time, revealing structural changes that affect performance. The reactor is designed to operate in transmission mode from vacuum conditions to pressures up to 20 bar of different mixtures of gases and within a wide temperature range, covering from cryogenic temperatures up to a maximum of 500℃, while allowing the sample to move vertically few millimetres in order to alternate between exposing it and the background. Currently in production, the design's key aspects are presented, covering the sample position mechanics, the various FEA calculations performed as well as the necessary auxiliary systems, such as cooling mechanisms and the pressurized gas circuit.

Footnotes

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