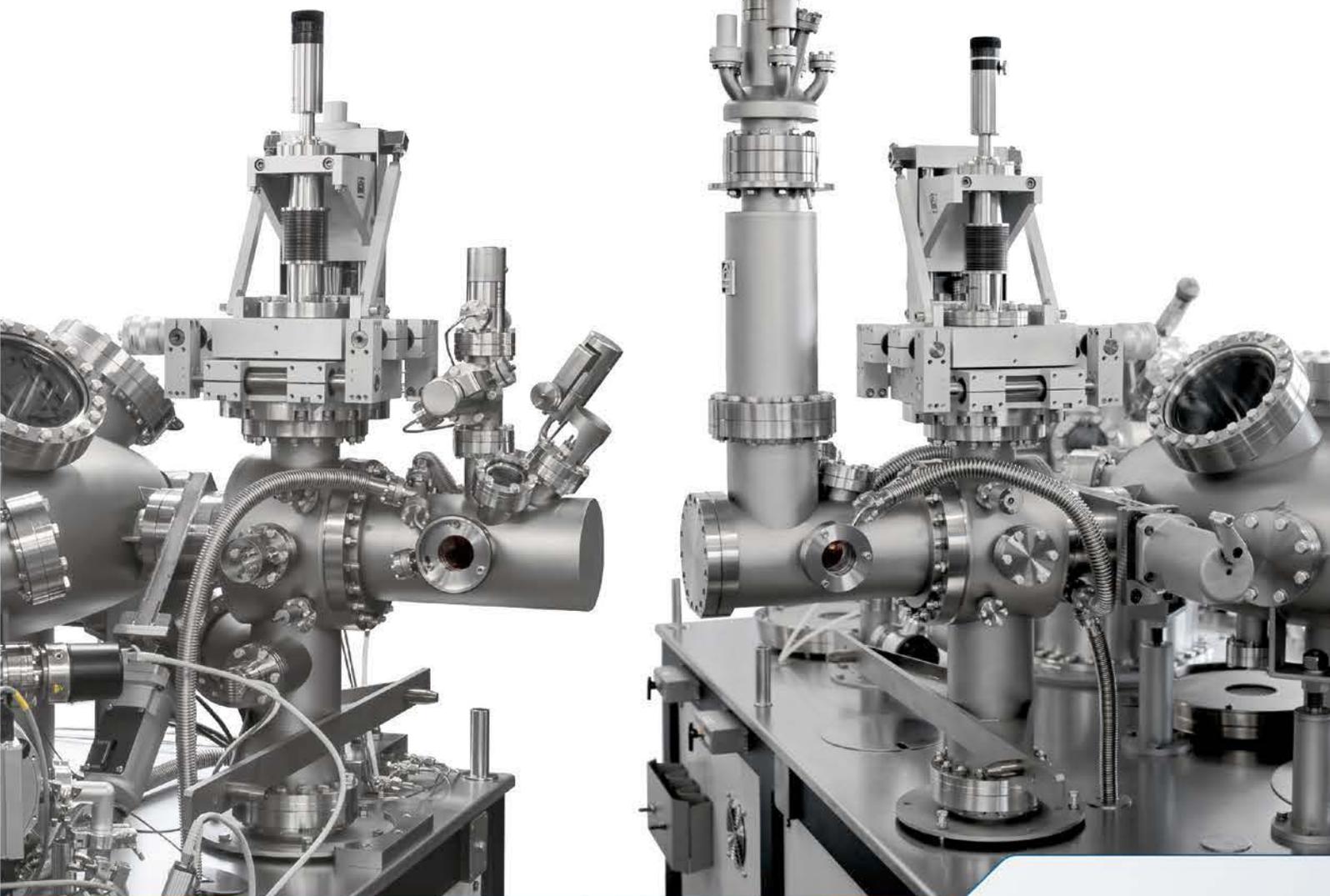


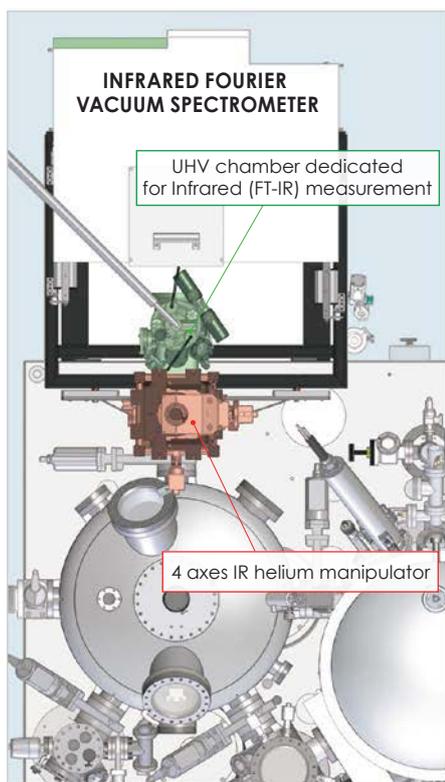
Precision and Vacuum Technology



# FTIR SPECTROSCOPY

in UHV multitechnique systems

The **infrared chamber** is specifically designed for **IR Spectroscopic investigations**. It is equipped with a precision sample positioning mechanism, viewports and spare ports for future equipment. Potassium bromide glass ports are included and the system is prepared for use with the Bruker Optics Inc. infrared spectrometers. Other commercially available spectrometers may be interfaced on request.

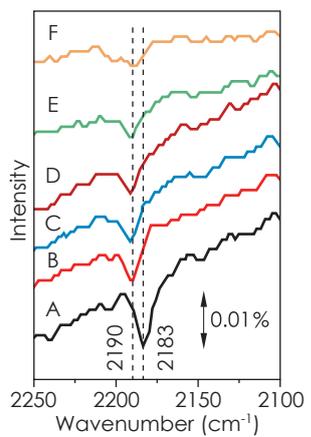


- Base pressure:  $2 \times 10^{-10}$  mbar
- Working pressure:  $10^{-10}$  mbar (with suitable gas dosing system)

### OPTIONS

- TDS Thermal Desorption Spectroscopy
- IS40C1 cleaning Ion Source
- Gas dosing system
- Wide range pressure regulation system (1 mbar -  $10^{-10}$  mbar)

### FTIR data for CO / rutile TiO<sub>2</sub> (110)



RAIRS data of CO adsorbed on the TiO<sub>2</sub>(110) single crystal surface at 110 K

**A**  $P_{CO} = 10^{-7}$  mbar

**B** after evacuation to  $10^{-10}$  mbar

**C** after exposing for 8 min to UV light (3.2 eV) in the presence of  $10^{-7}$  mbar of O<sub>2</sub>

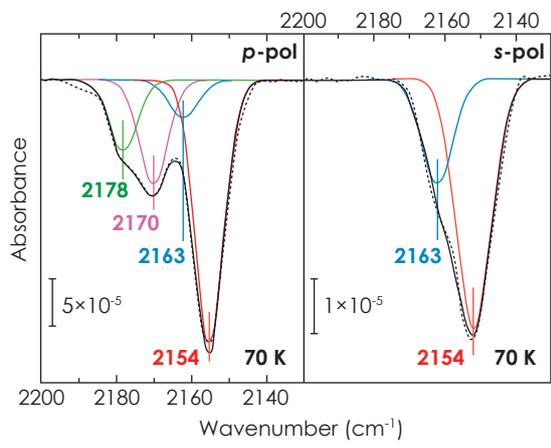
**D** after a total exposure of 24 min to UV light

**E** after a total exposure of 40 min to UV light

**F** after a total exposure of 56 min to UV light the CO<sub>2</sub> region; labels correspond to those of panel

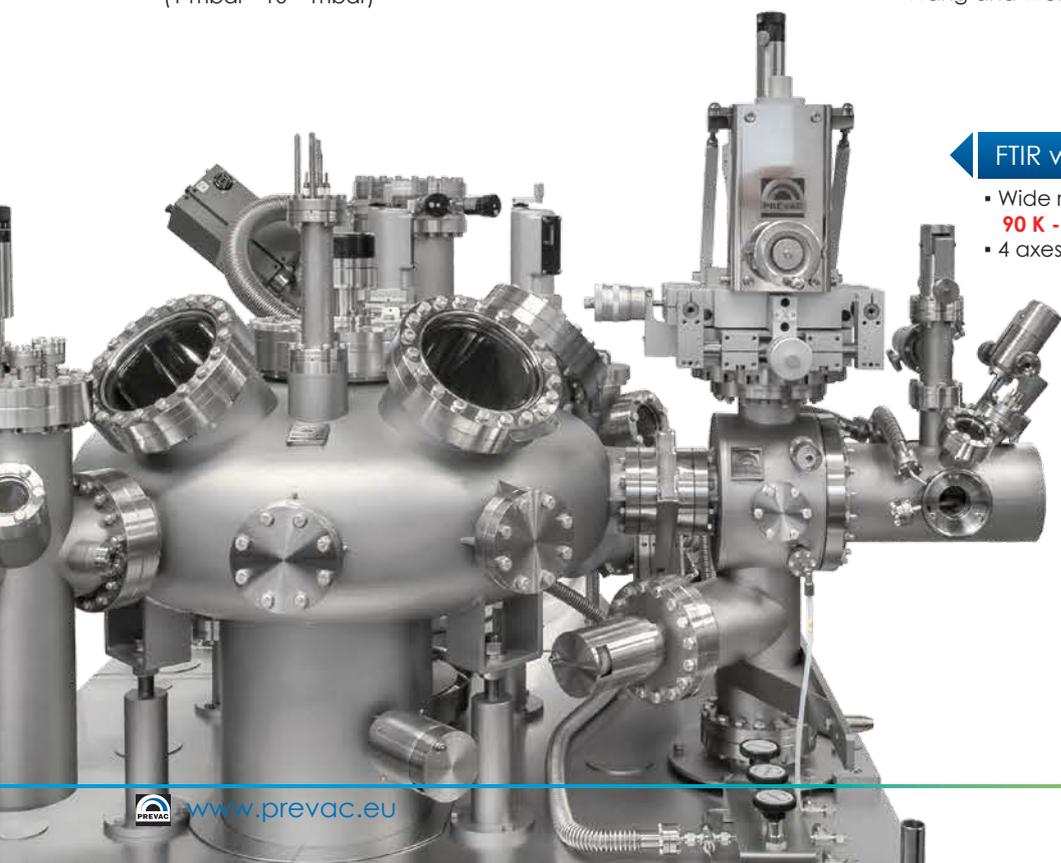
Wang et al., Rev. Sci. Instrum. 80, 113108 (2009)

### CeO<sub>2</sub>(110) surface faceting probed by IRRAS after CO adsorption



Fitting of p- and s-polarized spectra of faceted CeO<sub>2</sub>(110) exposed to CO at 70 K with light incident along the [110] azimuth (reproduced with permission from Yang et al., Angew. Chem., Int. Ed., 2016, 56, 375–379. Copyright 2017, Wiley-VCH).

Wang and Wöll, Chem. Soc. Rev., 2017,46, 1875-1932

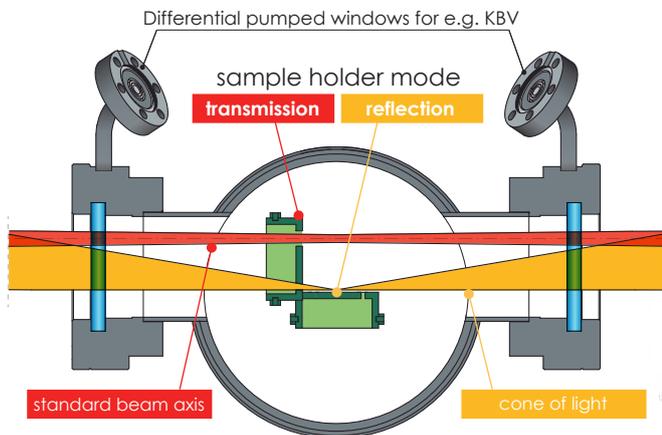


### FTIR with LN<sub>2</sub> COOLING SOLUTION

- Wide range of sample temperatures: **90 K - 2000 °C**
- 4 axes manipulator



## INFRARED TRANSMISSION AND REFLECTION MODE



Operation over the full temperature range in both **transmission** and **reflection** mode.

The innovative design enables not only reflection-absorption infrared spectroscopy (RAIRS) measurements at grazing incidence on well-defined, perfectly flat substrates, but also allows supports IR measurements in transmission mode for polycrystalline powder samples.

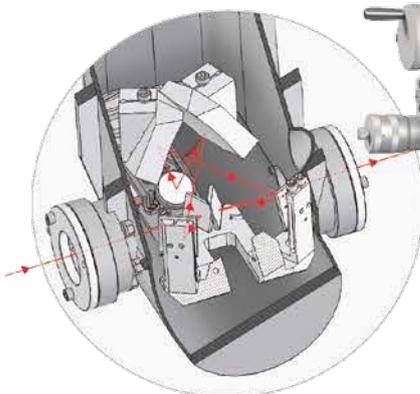


Dedicated PTS sample holder for infrared investigations.

Possibility to use flag style holders.



The **IR analyser frame** is independent and can be easily disconnected from the main frame and moved to another position in the laboratory. The system can be extended in the future with the addition of other chambers or techniques e.g. MBE.



**Option** for transmission spectroscopy: **DRIFT**, **ATR**, **RAIRS** and spectral imaging for the investigation of functional nanomaterials surfaces, adsorption and chemisorption over a wide range of temperature, pressure & gas mixtures.

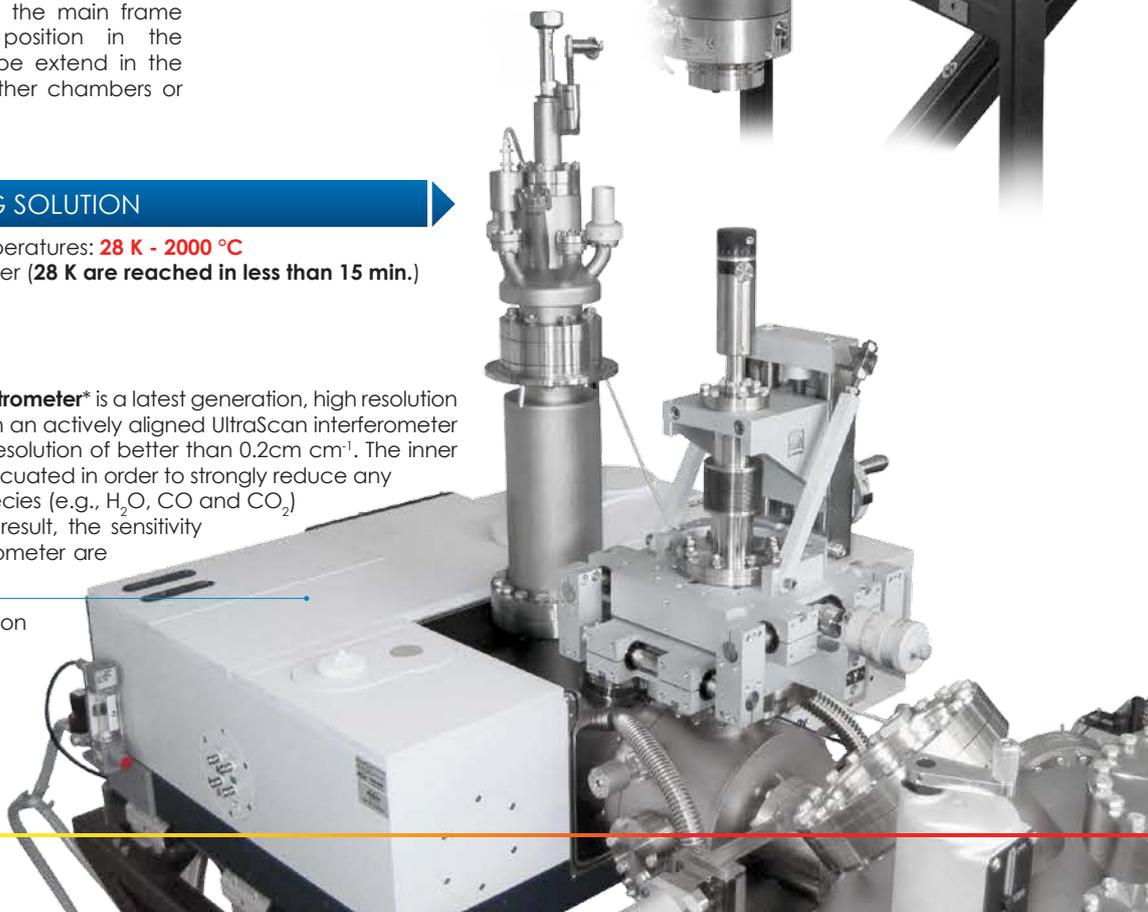


## FTIR with LHe COOLING SOLUTION

- Wide range of sample temperatures: **28 K - 2000 °C** depending on sample holder (**28 K are reached in less than 15 min.**)
- 4 axes manipulator

The Bruker **Vertex 80v FTIR Spectrometer\*** is a latest generation, high resolution vacuum FTIR spectrometer with an actively aligned UltraScan interferometer providing a standard optical resolution of better than  $0.2\text{cm}^{-1}$ . The inner part of the spectrometer is evacuated in order to strongly reduce any absorption from gas phase species (e.g.,  $\text{H}_2\text{O}$ ,  $\text{CO}$  and  $\text{CO}_2$ ) along the optical path. As a result, the sensitivity and the stability of the spectrometer are enhanced substantially.

\* other spectrometers adaptation on request.



## CUSTOMER DESIGNS

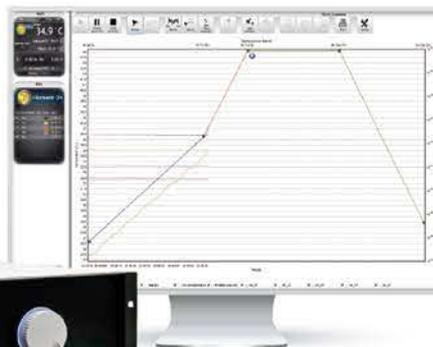
Adaptations for other commercial FTIR spectrometers e.g. Bruker Vertex 70v.



## RELATED PRODUCTS

### RTGA / TDS 40A1

The TDS 40A1 is designed for Temperature Programmed Desorption (TPD) applications. TPD involves heating a sample under UHV conditions and simultaneously monitoring a number of desorbing gas species as a function of sample temperature.



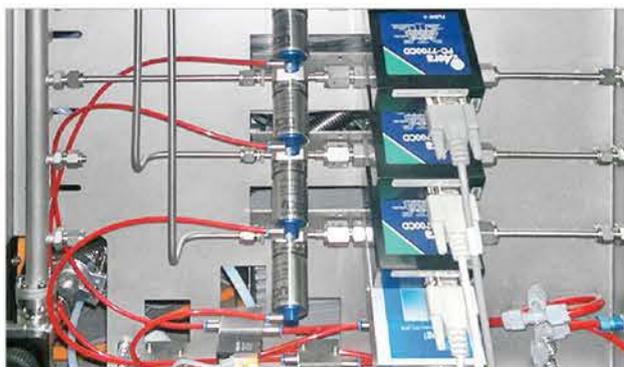
### ION SOURCE IS 40C1

The Ion Source IS 40C1 is a compact, easy-to-use extractor type ion gun for sample surface cleaning. The source generates an ion current of  $>70 \mu\text{A}/\text{cm}^2$  (Argon) with Gaussian beam profile. The source insertion length is adaptable to individual requirements (between 62.5 mm - 384.5 mm, other on request).



### GAS DOSING SYSTEM

- Process gas 2=4 lines
- Mass flow controlled for 4 gases



UHV SYSTEMS



If you need any further information, please do not hesitate to contact our sales department

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