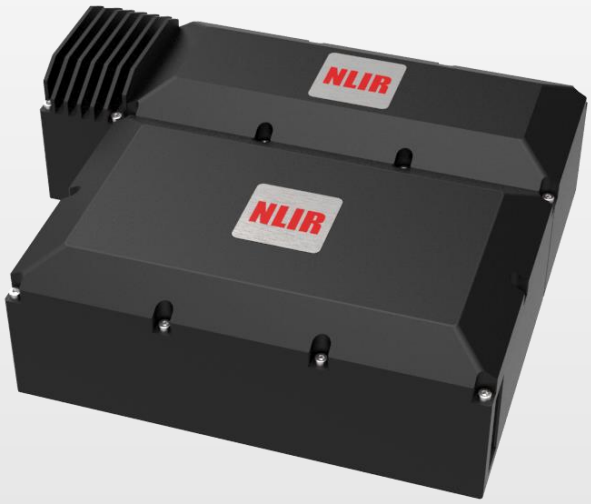
NLIR

Nonlinear Infrared Sensors

Mid-Infrared Spectrometers

Fast – Sensitive – Rugged

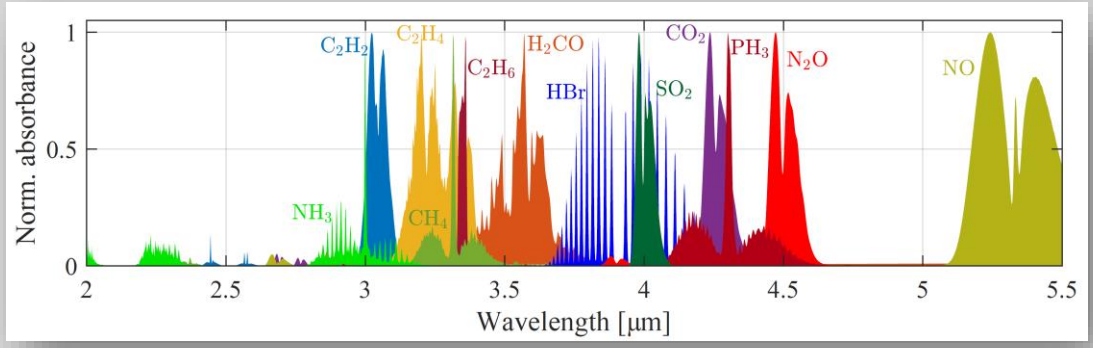


- Broadband operation from 2.0 – 5.5 µm / 1818 – 5000 cm^{-1}
- Entire spectrum in milliseconds
- Very robust – no moving parts
- Based on novel upconversion technology

NLIR Mid-Infrared Spectrometer S2055

– a new paradigm in mid-infrared light detection

Mid-infrared (MIR) photospectroscopy is used in both industry and research for non-invasive characterisation of gasses, liquids and solids. The NLIR MIR spectrometer is based on a novel measurement scheme that upconverts the MIR light to near-visible light. Near-visible light detectors (for example CCDs) are far superior to MIR light detectors (for example MCT arrays) in terms of detectivity, speed and noise. The NLIR upconversion technology therefore brings these attractive features, and the advantages that follow, to the MIR regime. The NLIR S2055 spectrometer covers a broad part of the MIR spectrum where the spectral fingerprints of many C-H bonds of gases are located together with those of a number of other common gases. Many plastics (independent of color) also absorb in this MIR region, which makes identification easily accessible.



Spectra of gases detectable with the NLIR S2055 (from Hitran database)

Key applications:

- Black plastic sorting
- Gas concentration measurements
- Polymer identification
- Petrochemical analysis
- Broadband IR coating quality control
- MIR super-continuum light measurements

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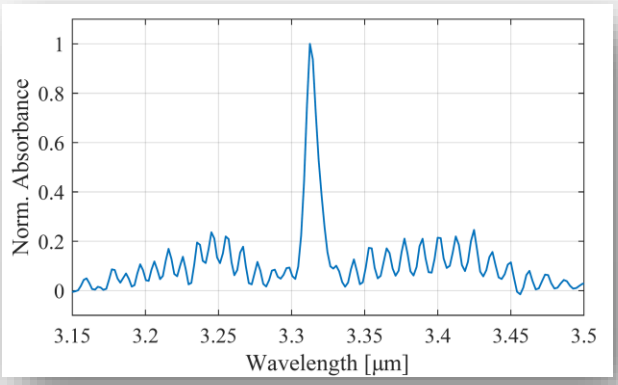
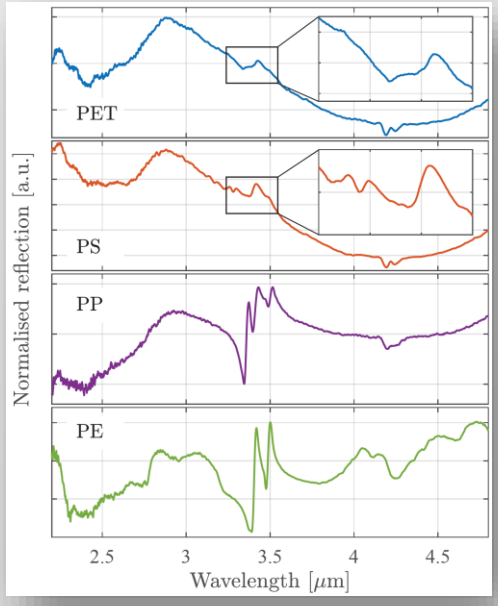


Methane gas transmission spectrum measured with the NLIR spectrometer using a MIR supercontinuum light source through a 50 cm gas cell and using 60 ms integration time. The resolution is approx. 4 cm^{-1}.

Example of black plastic reflection spectroscopy on the most common types of waste plastic, polyethylene terephthalate (PET), polystyrene (PS), polypropylene (PP), and polyethylene (PE). From measurements as these, even black plastics can easily be identified and sorted. This is otherwise a challenge because black plastics cannot be identified by NIR spectroscopy, which is the conventional method for plastic identification.



NLIR S2055	
Bandwidth	2.0 – 5.5 µm / 1818 – 5000 cm^{-1}
SNR @ 1 s	~ 8.000 (up to 20.000)
Resolution	3 – 8 cm^{-1} (depending on light source)
Maximum spectrum readout rate	100 Hz
Optical input	Free space
Connection	USB
Measurement options	Transmission, reflection, ATR
Bit depth	14 bit
Physical dimensions (h × l × w)	70 mm × 230 mm × 260 mm

These specifications may be changed without notice.

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