

# Spectroscopy with Polymer Optics

## Reproducible Precision

Spectroscopic gas analysis places the highest demands on optical components: stable transmission in the IR/NIR range, minimal scattering losses, tight tolerances, and absolute process reliability.

Whether for breath gas spectroscopy, fluorescence spectroscopy of tissue samples in medical diagnostics, or rapid material detection in industrial settings: our solutions – such as beam splitters, mirrors, lens arrays, or complex parabolic mirror housings – ensure that your measurements are captured reliably and consistently.

Our optics offer optimally tuned transmission and reflection at your target wavelength, achieving sub-micron tolerances even for complex freeform surfaces. Highly reflective or selectively transmitting coatings ensure stable optical properties – even under thermal load – delivering maximum system performance throughout the entire product lifecycle.

## Fields of Application

### Medical gas analyzers

High-transparency mirrors and lenses for CO<sub>2</sub>/O<sub>2</sub> detection in anesthesia devices – with high reflectivity at specific IR wavelengths

### Industrial gas detectors

Temperature- and pressure-stable beam splitters for harsh environments – e.g. tunnel monitoring or oil & gas applications

### IR/NIR absorption spectroscopy

Polymer optics with stable transmission in the 850–1100 nm range – for detecting gaseous target substances

### Ventilation & diagnostics sensors

Miniaturized lens arrays with low scattering for patient interfaces and modular sensor components

### Food & environmental analytics

Thermally stable optics for detecting organic compounds – also under long-term exposure

## Specifications

- **Transmission:** 92-99.5% @ 850-1100 nm (depending on material and coating)
- **Coating options:**
  - Emitter mirror with >95% reflection @ 4.26 µm
  - Beam splitter with defined partial transmission @ 3-5 µm
  - Anti-reflection and interference filters for NIR
- **Tolerances & surface quality:**
  - PV < 1 µm
  - Ra < 10 nm
- **Material options:**
  - PMMA, e.g. Plexiglas, Altuglas
  - PC-HT, e.g. Makrolon, Lexan
  - PEI, e.g. Ultem
  - PFA, e.g. CYTOP
  - Amorphous PA, e.g. Trogamid T, CX
- **Reproducibility:**
  - High series quality via statistical process control and DOE (Design of Experiments)
  - Documented by functional tests or measurements, e.g. interferometry