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HR MIRRORS

- R > 99.98 % in the wavelength range 400 ... 1600nm
- Applicable for cavity ring-down spectroscopy
- Low scattering losses, e.g. total scattering TS = 1.5×10^{-5} at 633nm (HR mirror for 633nm)*

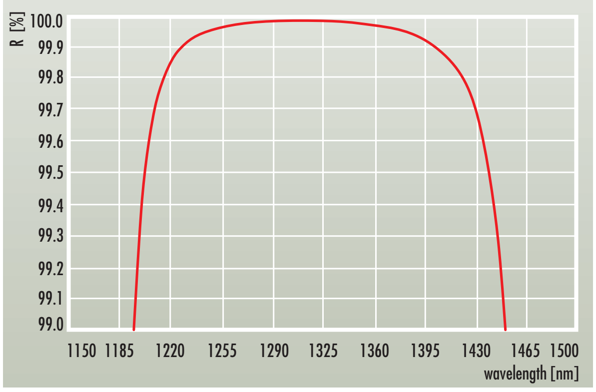

Figure 1: Calculated reflectance spectrum of a high reflectance mirror for the NIR
Central wavelength: 1300nm
Reflectance derived from cavity ring-down time measurement: R = 99.98 %

- Coating technique: magnetron sputtering
- Optical parameters are stable against changes of temperature and humidity
- Substrates:
  - Special polished plane and spherically curved fused silica substrates from our own production (see pages 66 – 67)
  - Concave substrates with a wide variety of radii
  - Rms-roughness: ≤ 1.5 Å
  - Surface quality: 10 – 5 scratch-digs (MIL-0-13830) 5/1 x 0.025 (according to ISO 10110)
- Attractive prices for small and medium numbers of substrates per coating run
- Customer specific components (with respect to substrate dimensions as well as with respect to the coating design)

- Very high reflectances also for complex coating designs, e.g. negative dispersive femtosecond laser mirrors with R > 99.9 % (see pages 32 – 43)

* Measurement performed at Jenoptik L.O.S. GmbH, Jena

CAVITY RING-DOWN TIME MEASUREMENTS

Our mirrors were tested by cavity ring-down time measurements performed at several laboratories in Great Britain, France, The Netherlands and Germany. Some results are given in the table below.

As result of these investigations cavity ring-down spectroscopy systems for the analysis of trace gases were developed which use LAYERTEC mirrors. More information on the experimental setup and the recent developments can be found in the references given below.

Coating specification	Wavelength of measurement	R [%]	T [%]	Measured at
HR(0°, 380–390nm)	388nm	>99.94	n. m.*	Universität Heidelberg, Germany
HR(0°, 410nm)	435nm	99.986	n. m.*	3) University of Bristol, UK
HR(0°, 640–790nm) + HT(0°, 488–532nm)	780nm	99.983	n. m.*	2) University of Grenoble, France
HR(0°, 1300–1600nm)	1313nm	99.95079 ± 0.00005	0.05	1) University of Grenoble, France
HR(0°, 1320nm)	1313nm	99.981 ± 0.002	n.m.*	1) University of Grenoble, France
HR(0°, 1390nm)	1390nm	99.992	0.0016	University of Groningen, The Netherlands
HR(0°, 1550nm)	1520nm	99.987	n. m.*	5) University of Bristol, UK
HR(0°, 1650nm)	1623nm	99.985	n. m.*	5) University of Bristol, UK
HR(0°, 1650nm)	1648nm	99.983	n. m.*	4) University of Bristol, UK

Table 1: Reflectance and transmittance values of LAYERTECs low loss mirrors; Reflectance measured by cavity ring-down time spectroscopy

* n. m. … not measured

References:

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3) M. I. Mazurenka, B. L. Fawcett, J. F. M. Elks, D. E. Shallcross, A. J. Orr-Ewing, "410nm diode laser cavity ring-down spectroscopy for trace detection of NO_2", Chem. Phys. Letters 367 (2003) 1–9
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5) A. M. Parkes, B. L. Fawcett, R. E. Austin, S. Nakamichi, D. E. Shallcross, A. J. Orr-Ewing, "Trace detection of volatile organic compounds by diode laser cavity ring-down spectroscopy", The ANALYST (2003), 128, 960–965