

Broadband Mirrors for Ultrafast Lasers

These high reflectors support very broadband operation in Ti:S ultrafast lasers, and are primarily intended for use intracavity and in pulse compressors. In particular, these mirrors offer high reflectivity (>99.7%) from 650 nm to 1100 nm, as well as minimal group velocity dispersion (GVD) and third order dispersion (TOD), thus enabling near transform-limited pulse performance over the entire Ti:S tuning range. Coatings for these optics are fabricated utilizing ion beam sputtering (IBS). This technology delivers the refractive index and layer thickness precision necessary to reliably meet both performance and GVD/TOD specifications, and also produces a fully densified film with exceptional long term environmental stability.



These high reflectors can be designed for operation anywhere in the 0° to 45° angle of incidence range, and are typically supplied on fused silica substrates over the 0.25" to 3" diameter range. Nominal surface flatness for these mirrors is $\lambda/10$ at 632.8 nm, and surface quality is 10-5. REO can also readily customize the center wavelength, bandwidth and dispersion characteristics of these coatings, and can fabricate these mirrors on a broad range of custom substrate materials and sizes.

This type of high performance, broadband optics are key to enabling the next generation of widely tunable ultrafast laser oscillators for demanding applications such as multi-photon excitation microscopy, seeding terawatt amplifiers, and CEP-stabilized systems. In particular they support the new generation of one-box laser oscillators where wavelength tuning and other output parameters are adjusted in a simple push-button operation rather than by physically exchanging cavity optics with limited bandwidth.

Typical Specifications

Substrate Material	Fused Silica and others
Design wavelength range	650 nm to 1100 nm
Reflectivity	99.7%
Surface flatness (@ 633 nm)	$\lambda/10$
Surface quality	10-5 or better
Size range	0.25" to 3"
Clear Aperture	90%

