

High Performance Laser and Nonlinear Crystal Coatings

REO offers thin film coating services for a wide range of customer furnished laser gain and nonlinear crystals, including doped YVO₄, doped YAG, doped YLF, doped phosphate glass, doped YSGG, Ti:Sapphire, KTP, LBO, BBO and SBBO. Produced primarily using ion beam sputtering (IBS) technology, these coatings demonstrate a unique combination of long lifetime, environmental stability, high laser damage threshold, excellent optical performance and superior mechanical durability. REO has also developed an array of sophisticated tooling techniques that can precisely define the coating clear aperture without harming the optical surface, and that minimize overspray, while avoiding problems with adhesion or spatter. When combined with REO's suite of specialized crystal pretreatment and handling protocols that maximize yields, these thin films enable laser manufacturers to minimize component costs, while also delivering products that exhibit better lifetime and improved performance.



A primary advantage of IBS technology is that it creates fully densified coatings. These non-porous coatings are immune to moisture absorption during operation, extending their lifetimes and preventing shifts in coating performance with changes in ambient humidity. IBS coatings are also very mechanically durable, enabling them to be repeatedly cleaned. In addition, these dense thin films contain fewer defects than other coating types, thus maximizing laser damage resistance while simultaneously minimizing scatter and absorption. Finally, IBS technology enables greater precision and repeatability during deposition, which permits the production of very consistent coatings, including films with complex, multi-wavelength spectral performance.

REO also maintains an extensive suite of metrology equipment to verify every aspect of coating performance. This includes in-house laser damage testing, direct absorption measurement, laser photometers, spectrophotometers and surface roughness measurement.

Typical Coating Specifications

Substrate Materials	YVO ₄ , doped YAG, doped YLF, doped phosphate glass, doped YSGG, Ti:Sapphire, KTP, LBO, BBO and SBBO
Wavelength Range	266 nm – 2 μm
Coating Options	Antireflection, multiwavelength antireflection, dichroic
Temperature Range	–196 °C to 400 °C
Scattering	<10 ppm
Humidity range	0 to 100%
Aperture Size range	1 mm to 25.4 mm
Clear Aperture	90%