Sapphire (Al\(_2\)O\(_3\)) Optics for Infra-Red Systems

Knight Optical can offer Sapphire (Al\(_2\)O\(_3\)) Optics for Infra-red systems over the waveband of 0.2 to 5\(\mu\)m. We offer Al\(_2\)O\(_3\) optics for UV, Visible, NIR (0.9 to 1.5\(\mu\)m) and Mid-Waveband Infra-Red (MWIR, 3 to 5\(\mu\)m) Imaging Systems. Al\(_2\)O\(_3\) has hardness of about HK2000, which makes it a better choice for windows and outer elements of lens systems. Al\(_2\)O\(_3\) has a good transmission in the MWIR band, and can be used with optical glass in the NIR, and with Silicon or Germanium in the MWIR, to form well corrected doublets and lens systems.

These systems include, for example, Forward Looking Infra-Red (FLIR) systems, and thermography. Al\(_2\)O\(_3\) has a refractive index of about 1.9288no 1.9174ne at 200nm through to 1.623no 1.615ne in the IR (5\(\mu\)m). This pairing will allow for the design and manufacture of a colour corrected lens that can be used in broad spectrum thermal imaging systems.

The imaging systems that make use of the MWIR includes a system that can detect the presence of a sniper and, with other visible systems, determine the type of threat and where that threat is targeting. The MWIR waveband is used to detect the muzzle flash from a gun, or plume from a rocket, by looking for the distinct spectral distribution from the hot gasses that are emitted. These gasses are, for example, CO and H\(_2\) together with CO\(_2\), N\(_2\), and H\(_2\)O that produce distinct emissions in the 3 to 5\(\mu\)m band.

Al\(_2\)O\(_3\) being slightly birefringent has the material cut with the optic axis perpendicular to the surface plane. This cut ensures that the ordinary and extraordinary rays travel the same path and thus remain in phase.

Al\(_2\)O\(_3\) when it is doped with Titanium is used as a laser that can be ‘tuned’ other a broad range.

Contact our multilingual technical sales team and discover how Knight Optical’s high quality Sapphire optics and superior service can improve your instrumentation and supply chain experience. Tel +44 (0)1622 859 444.