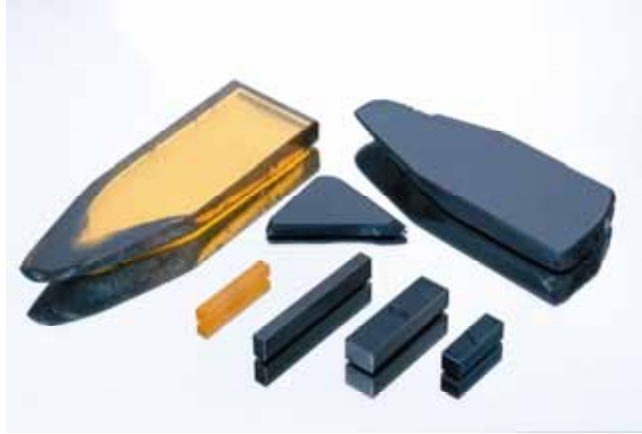




# Gooch & Housego



## IR Materials: AgGaS<sub>2</sub>, AgGaSe<sub>2</sub>, CdS, & CdSe

G&H offers several crystal materials for IR applications including AgGaS<sub>2</sub> (AGS), AgGaSe<sub>2</sub> (AGSe), CdS, and CdSe.

AgGaS<sub>2</sub> (AGS) displays excellent bulk quality across the transmission range, except for residual e ray absorption centered near 1.8μm. Surface absorption may increase with time, but the behavior is now greatly improved over that of earlier crystals. The phase matching and nonlinear optical properties of AGS allow various SFM/DFM interactions from the visible to mid-IR.

A closely related crystal, AgGaSe<sub>2</sub> (AGSe) has demonstrated efficient frequency doubling of infrared radiation such as the 10.6μm output of CO<sub>2</sub> lasers. It has also been shown to be an excellent crystal for nonlinear three-wave interactions. This crystal has a high nonlinear coefficient, high damage threshold, and a wide transmission range. It also has low optical absorption and scattering and low wave front distortion.

CdS and CdSe have similar indices of refraction in the IR. While both make excellent IR wave plates, CdS transmits some visible wavelengths and CdSe does not; however, CdSe transmits further into the infrared. Together they combine to form a combination suitable for producing high performance achromatic IR wave plates.

Mixed crystals are available in the systems CdS-CdSe, with properties intermediate between the end members. Inquiries are welcomed.

Please contact the sales team for further information.

### Key Features:

- Wide IR Transmission Range
- Unique Optical Characteristics
- Large Nonlinear Coefficient (AGS & AGSe)
- Standard and Custom Sizes

### Applications:

- Astronomical
- Medical
- Industrial
- Defense
- Research



光技術をサポートする

株式会社オプトサイエンス

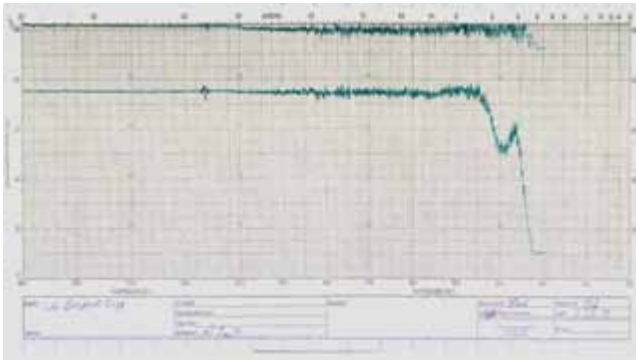
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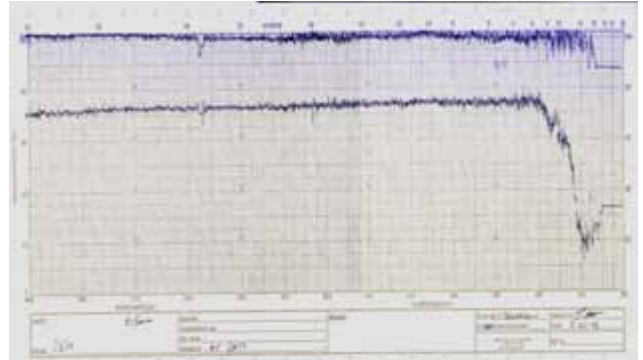
### Optical Specifications

Parameter	Specification		Unit
<b>Material</b>	<b>CdS</b>	<b>CdSe</b>	-
Transmission Range (>50%) for 2 mm Thickness	0.53 – 15	0.8 – 18	$\mu\text{m}$
Absorption coeff. @10.6 $\mu\text{m}$	0.01	0.001	$\text{cm}^{-1}$
Refractive Index @ 10.6 $\mu\text{m}$	$n_o$ 2.226, $n_e$ 2.239	$n_o$ 2.430, $n_e$ 2.448	-
<b>Material</b>	<b>AGS</b>	<b>AGSe</b>	-
Transmission Range $\alpha < 3 \text{ cm}^{-1}$	0.50 – 13.2	0.78 – 18	$\mu\text{m}$
Absorption coeff. @10.6 $\mu\text{m}$	0.6	< 0.02	$\text{cm}^{-1}$
Refractive Index @ 10.6 $\mu\text{m}$	$n_o$ 2.3472, $n_e$ 2.2934	$n_o$ 2.5912, $n_e$ 2.5579	-

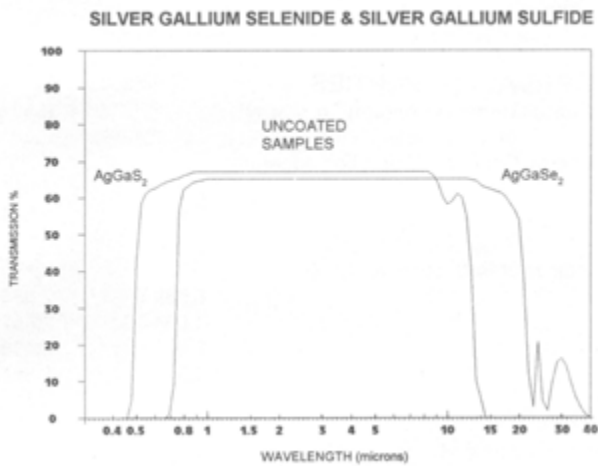
### Spectral Transmittance



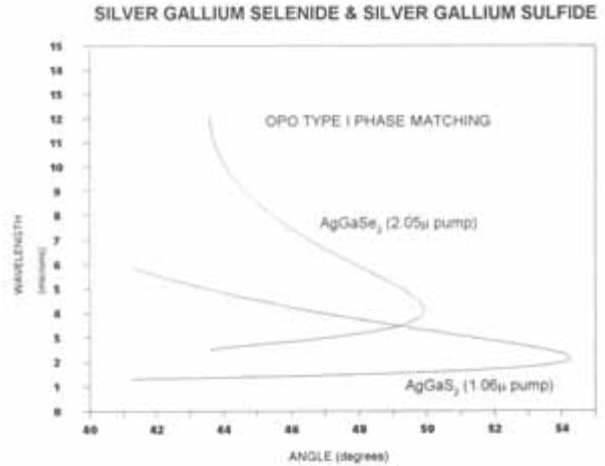
Spectral transmittance for 10 mm path length in CdS



Spectral transmittance for 5 mm path length in CdSe



Spectral transmittance (illustration) for AGS & AGSe



Type I OPO phase matching for AGS & AGSe