

Silver Chloride (AgCl)

MATERIALS DATA

Silver Chloride is grown into small ingots by the sealed-ampoule Stockbarger techniques. Silver chloride is malleable and milky-white it darkens in sunlight, but mild darkening does not affect the IR performance.

APPLICATIONS: Silver Chloride is a useful material for deep IR applications where sensitivity to moisture is a problem. This soft crystal deforms under heat and pressure and can be forged in polished dies to create IR windows and lenses. A major use for Silver Chloride is in the manufacture of small disposable cell windows for spectroscopy, known as mini-cells. These windows have a depression of controlled thickness pressed into the surface. The inherent cost of Silver Chloride material is offset against ease of manufacture.

Transmission Range	0.4 to 25 μ m (1)
Refractive Index	1.98 at 10 μ m (1)
Reflection Loss	19.5% at 10 μ m (2 surfaces)
Absorption Coefficient	n/a
Reststrahlen Peak	81.5 μ m
dn/dT	-61 x 10 ⁻⁶ K ⁻¹
dn/d μ = 0	4.5 μ m
Density	5.59 g/cc
Melting Point	457 °C
Thermal Conductivity	1.15 W m ⁻¹ K ⁻¹ at 278 K
Thermal Expansion	31 x 10 ⁻⁶ K ⁻¹ at 302 K
Hardness	Knoop 9.5 with 200g indenter
Specific Heat Capacity	355 J Kg ⁻¹ K ⁻¹
Dielectric Constant	12.3 at 1MHz
Youngs Modulus (E)	19.98 GPa
Shear Modulus (G)	7.099 GPa
Bulk Modulus (K)	44.04 GPa
Elastic Coefficients	C ₁₁ =60.1 C ₁₂ =36.2 C ₄₄ =6.25
Apparent Elastic Limit	26.2MPa (3800 psi)
Poisson Ratio	0.4
Solubility	52 x 10 ⁻⁶ g/100g water at 50°C
Molecular Weight	143.34
Class/Structure	Cubic FCC, NaCl, Fm3m, No cleavage, cold flows



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μm	No	μm	No	μm	No
0.500	2.09658	1.000	2.02239	1.500	2.01047
2.000	2.00615	2.500	2.00386	3.000	2.0023
3.500	2.00102	4.000	1.99983	4.500	1.99866
5.000	1.99745	5.500	1.99618	6.000	1.99483
6.500	1.99339	7.000	1.99185	7.500	1.99021
8.000	1.98847	8.500	1.98661	9.000	1.98464
9.500	1.98255	10.00	1.98034	10.50	1.97801
11.00	1.97556	11.50	1.97297	12.00	1.97026
12.50	1.96742	13.00	1.96444	13.50	1.96133
14.00	1.95807	14.50	1.95467	15.00	1.95113
15.50	1.94743	16.00	1.94358	16.50	1.93958
17.00	1.93542	17.50	1.93109	18.00	1.9266
18.50	1.92194	19.00	1.91710	19.50	1.91208
20.00	1.90688	20.50	1.90149		

