

TABLE 6

Pressure cells used in Raman spectroscopy

Type of cell	Optical instrument	Pressure limits (kbar)	Temp. limits (K)	Windows	Remarks	Ref.
Opposed anvil	Spex 1401	100	77-350	Diamond	Solids	59
Drickamer	Spex 1401	100	77-350	Diamond	Solids	45
Opposed anvil	Spex 1401 Cary 81	200	573	Diamond	Solids, liquids	60, 61
Hydrostatic gas pressure	Spex 1401	9	77-290	Sapphire, quartz	Solids, gases	38
Waspaloy (opposed anvil)	Spex 1401	200	to 973	Diamond	Solids, liquids, solutions	54
Drickamer	Spex 1400	100	4-1300	NaCl, diamond	Solids, liquids solutions	46
Daniels	Spex 1400	10	R.T.	Sapphire	Solids	79
Sapphire, back-scattering	Cary 81	11	473-573	Sapphire	Solutions, solids, liquids	80, 81
Piston-cylinder	Jarrell-Ash	< 3		Sapphire	Solutions, liquids	82
Piston-cylinder	Coderg	10	2-300	Sapphire	Solids, liquids, solutions, gases	83
Opposed anvil	Coderg	30		Diamond, sapphire	Solids	53, 74
Daniels	Spex 1401	10	77-400	Sapphire	Solids, liquids, and Brillouin spectra	84-86
Piston-cylinder	Spex 1401	7	1.4 to R.T.	Sapphire	Solids	87
Pressure vessel	Jarrell-Ash	220	100-700	Diamond	Solids, liquids, solutions	88
Special cell	Spex 1405	3	223-473	Quartz	Liquids, gases	89
Drickamer	Cary 81	55	77-500	Sapphire	Solids	a

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TABLE 7
High pressure in optical materials^a

Material	Spectral range (μm)	Refractive index ^b at λ (μm)	Modulus of rupture ^b (p.s.i.)	Young's modulus ^b (p.s.i.)	Compressive strength (p.s.i.)	Hardness Knoop No.	Solubility (g/100 g H ₂ O)
NaCl	0.2–15	1.52 at 4 1.4 at 10		5.8×10^6		15.2–18.2	35.7(0°C)
Lithium fluoride, LiF	0.11–6	1.35 at 4 1.1 at 10		$9.40\text{--}11 \times 10^6$		102–113	0.27(18°C)
Irtran 1, MgF ₂	1–8	1.35 at 4	21 800	16.6×10^6	157 600	576	0.0076 (18°C)
Calcium fluoride, CaF ₂	0.13–9	1.41 at 4		$11\text{--}15 \times 10^6$		158	0.0016 (18°C)
Irtran 3, CaF ₂	1–10	1.41 at 4 1.34 at 8.3	5 300	14.3×10^6		200	Insoluble
Irtran 2, ZnS	2–14	2.25 at 4 2.20 at 10	14 100	14×10^6	121 200	354	0.00069 (18°C)
Irtran 4, ZnSe	0.5–20	2.5 at 4 2.4 at 10	6 100	10.3×10^6		150	Insoluble
Magnesium oxide, MgO	≤ 6.8	1.7 at 2.2 1.66 at 4.3		3.6×10^6		690–692	0.000012
Irtran 5, MgO	1–8	1.67 at 4 1.60 at 6	19 200	48.2×10^6		640	0.00062