

Appendix 2

Summary of literature surveys of typical damage threshold in MW mm⁻² under 10 ns Q-switched 1.06 μm irradiation

Material	Front surface	Inclusions	Bulk void	Intrinsic	Rear surface
Nd:YAG	8–53	—	10	34–82	11–45
Nd:YAlO ₃	11–26	—	10	—	11–86
Nd:CaWO ₄	10–30	3–4	10	10–50	10–27
Nd:glass	10–350	1–10	10–18	12–350	12–180
KD*P	7–43	1–5	15	10–180	6–170
KDP	10–>240	1–3	10	10–570	10–185
ADP	4–>240	1–3	10	5–220	14–>45
LiNbO ₃	1–111	1–5	5	1–53	5–10
Calcite	5–30	1–5	5	5–20	5–15
Crystal quartz	12–300	—	10	12–310	20–52
BSC glasses	5–46	5–10	10	10–5000	10–>180
Flint glasses	9–20	3–6	6	6–>60	10–20
Fused silica	13–240	5–10	10	20–5000	20–>180

From Wood *et al* (1975).

Appendix 3

**Damage thresholds measured at the GEC Hirst Research Centre (MW mm⁻²)
1.064 μm irradiation, 10 ns**

Material	Front surface	Inclusions	Bulk void	Intrinsic	Rear surface
Nd:YAG	8–53	–	10	34–82	11–45
Nd:YAlO ₃	11–26	–	10	26–86	11–86
Nd:CaWO ₄	10–30	3–4	10	10–50	10–27
Nd:glass	14–180	5–10	15	20–>200	14–180
KD*P	7–43	1–2	15	15–180	15–170
KDP	39–185	1–2	10	64–185	50–185
ADP	22–>45	1–2	10	>45	22–>45
LiNbO ₃	5–30	1–5	5	5–20	5–12
Calcite	5–8	< 5	5	5–15	5–15
Crystal quartz	15–60	–	10	22–>195	21–52
BSC glasses	37–46	5–10	10	20–>180	20–>180
Flint glasses	9–20	3–6	6	6–>60	10–20
Fused silica	13–180	5–10	10	>195	21–>180

From Wood *et al* (1975).

Appendix 4

(a) Summary of LIDT measurements made at 10.6 μm at the GEC Hirst Research Centre on infrared window substrates and coatings (pulsewidth, τ = 100 ns)

Substrate	LIDT (MW mm ⁻²)		Substrate	Coating	LIDT (MW mm ⁻²)	
	Minimum	Maximum			Minimum	Maximum
Ge	0.6	11	Ge	ThF4	–	6.7
ZnSe	0.8	15	Ge	ZnSe	2	5.6
ZnS	2	9	Ge	ZnS:ThF4	0.3	11
GaAs	1.1	8	Ge	KCl:As ₂ S ₃	4.2	5
CdTe	1.1	2.9	Ge	KCl:ZnSe	3.8	4.2
Si	0.4	13	Ge	As ₂ S ₃	4	5.6
NaCl	–	43	Ge	SiO ₂	1.3	5.6
KCl	10	50	Ge	α-C:H	1.1	2.8
Diamond	22	<40	Ge	Zr ₂ O ₃	0.4	0.8
Synthetic diamond	–	16.8	Ge	Ge:ZnS	0.1	0.7
As ₂ S ₃	–	2.2	ZnSe	ZnS:ThF ₄	0.5	2.8
KRS-5	–	7.3	KCl	As ₂ S ₃ /KCl/ As ₂ S ₃	7	12
			KCl	As ₂ S ₃	5	6

(b) Summary of LIDT measurements made at 10.6 μm at the GEC Hirst Research Centre on metal mirrors

Substrate	Finish	LIDT (MW mm ⁻²)		Substrate	Coating	LIDT (MW mm ⁻²)	
		Minimum	Maximum			Minimum	Maximum
Cu	dt [†]	12	18	Cu	SiO ₂	6.2	>11.5
	polished	2	12	Cu	ThF ₄	0.7	>11.0
Ti	polished	–	3.1	Cu	ev Au	1.3	2.1
Pt	polished	–	7		pl Au	3.6	9.8
Ir	polished	7	14	Cu	Ni/Au	2	2.1
Pd	polished	–	3.9	Si	Ag	1.5	5.9
Re	polished	5	7.8	Ag	Si	1.5	5.6
Rh	polished	7	13.8	Zerodur	Ag	4.2	8.4
Zr	polished	–	>14				
Al	dt	–	12				
Au	dt	5	7				
Mo	dt	0.6	2.5				
Au/Cu	polished	–	7				
alloy							
Cr/Cu	polished	2.5	9.5				
alloy							
Cu/Zr	polished	–	2.8				
Invar	polished	2.8	6.2				

[†] Diamond-turned.
From Wood (1986).