

Appendix 1: Overview of photocathodes

Photocathode material	Work function/ E_{photon} (eV)	QE	λ (nm)	Operational lifetime	Vacuum (Torr)	Response time	Reference
<i>Metallic</i>							
Cu	4,3 - 4,7	0,014 %	266	Very long	10^{-7}	< ps	[1]
Mg	3,66	0,06 %	266	> 5000 h	10^{-7}	< ps	[1]
		0,027 %	266				[b*]
Mg (laser-cleaned)		0,20 %	266	Long	$10^{-9} - 10^{-8}$		[10]
Y	2,9	0,05 %	266	Long	< 10^{-7}	< ps	[1]
Sm	2,7	0,07 %	266	Long	< 10^{-7}	< ps	[1]
Ba	2,5	0,10 %	337	Short-long	< 10^{-7}	< ps	[1]
Nb	4	0,01 %	266				[23]
Ca	2,9	0,05 %	248				[b*]
Mg-Ba	low	0,10 %	266				[16]
<i>Semiconductor</i>							
Cs ₂ Te	3,5	4 - 20 %	251 - 266	Few hours - months	$10^{-10} - 10^{-9}$	~ ps	
CsTe +CsBr	4,1	5 - 6 %		> 2 months			[38]
		1,2 %	266	No difference	10^{-8}		[39]
CsKTe	4,0 - 4,5	22,5 %	259	T1/2 = 1+12 h	10^{-9}		[20],[28],
		2 % at saturation		Tsat= 20 h Tstor = 100 h			[29]
K ₂ Te	4,5	1,6 %	266				[b*]
		1 - 3%	262				[27]
		2,6 %	254		10^{-11}		[24]
		4,75 %	259	Long	$10^{-10} - 10^{-9}$		[25]
		8,3 %					[26]
		8,9 %					[20]
Rb ₂ Te	4,1	4,5 %	266				[b*]
RbCsTe		7,7 %	266				[b*]

Photocathode material	Work function/ E_{photons} (eV)	QE	λ (nm)	Operational lifetime	Vacuum (Torr)	Response time	Reference	
Alkali-antimonide	~2	8 %	527	T1/2 < 4 h	$10^{-10} - 10^{-9}$	~ ps	[1]	
		3 %	532	T1/e > 1 h	10^{-10}		[19]	
	4 %	534	T1/2 < 2 h		10^{-9}		[19], [29]	
	6 %	543			$10^{-11} - 10^{-10}$		[19]	
	5 %	312			150		[30],[37]	
	10%				0,1			
	4 %	527	T1/2 < 4 h		$10^{-10} - 10^{-9}$	~ ps	[1],[19]	
	2 %	266	Very short				[b*]	
	0,38 %	532	1 to few hours		10^{-9}		[19]	
	1,3 %	532			10^{-10}		[19]	
Alkali-halide	2	1 - 2%	527				[29]	
		9 %	543			$10^{-10} - 10^{-9}$	[19]	
	1 %	312					[35],[36]	
	2,3	1,6 %	266	Very short				[b*]
		0,023%	523	1 to few hours				
	< 1%	527	Short				[29]	
	2	6,1 %	266	Very short				[b*]
		0,02 %	532	1 to few hours				
	100 %	all colors					[31]	
	6,3	2 %	209	T1/2 > 150 h		$10^{-10} - 10^{-9}$	> ps	[1],[b*]
0,007%		262						
20 %		180					[92]	
5	0,73 %	213						
	0,13 %	262	T1/e > 1 y (storage)				[27]	

Photocathode material	Work function/ E_{photons} (eV)	QE	λ (nm)	Operational lifetime	Vacuum (Torr)	Response time	Reference
NEA	DC GaAs	5 %	527	T1/e = 58 h	$\sim 5 \cdot 10^{-11}$		[93]
	GaAs (Cs)	1.5 - 6%	750	Short	10^{-11}	< ns	[1]
	GaN (CsO)	20 %	300	10h + T1/2 = 8h	10^{-10}		[94],[95]
	GaN (Cs)	30 %	200				[96]
	Diamond	> 1%	< 210	Very long		> ps	[1]
	Polycrystalline diamond	10^6	266	Long			[33]
	Hydrogenated diamond	0,08 %	213		10^{-8}		[32]
	Nanostructured fullerene	0,002%	213		10^{-8}		[32]
Internal field-assisted	Lowered by external bias	15,7% enhanced	510				[34]
<i>Thermionic</i>	LaB ₆	0,1 %	355	~ 1 d	$< 10^{-7}$		[1]
	Thermionic dispenser	0,23 %	266	T1/2 = 12 h	$3 \cdot 10^{-10}$	< 380 ps	[1],[7]
	Trioxide thermionic	0,035%	266	T1/2 = 10 h	$3 \cdot 10^{-10}$	< 400 ps	[1]
<i>Ferroelectric</i>	Ferroelectric	0,06 %	355	Very long	$10^{(-7)}$	< ns	[1],[8],[9]
	Ferroelectric ceramic	10^6					[8],[9]