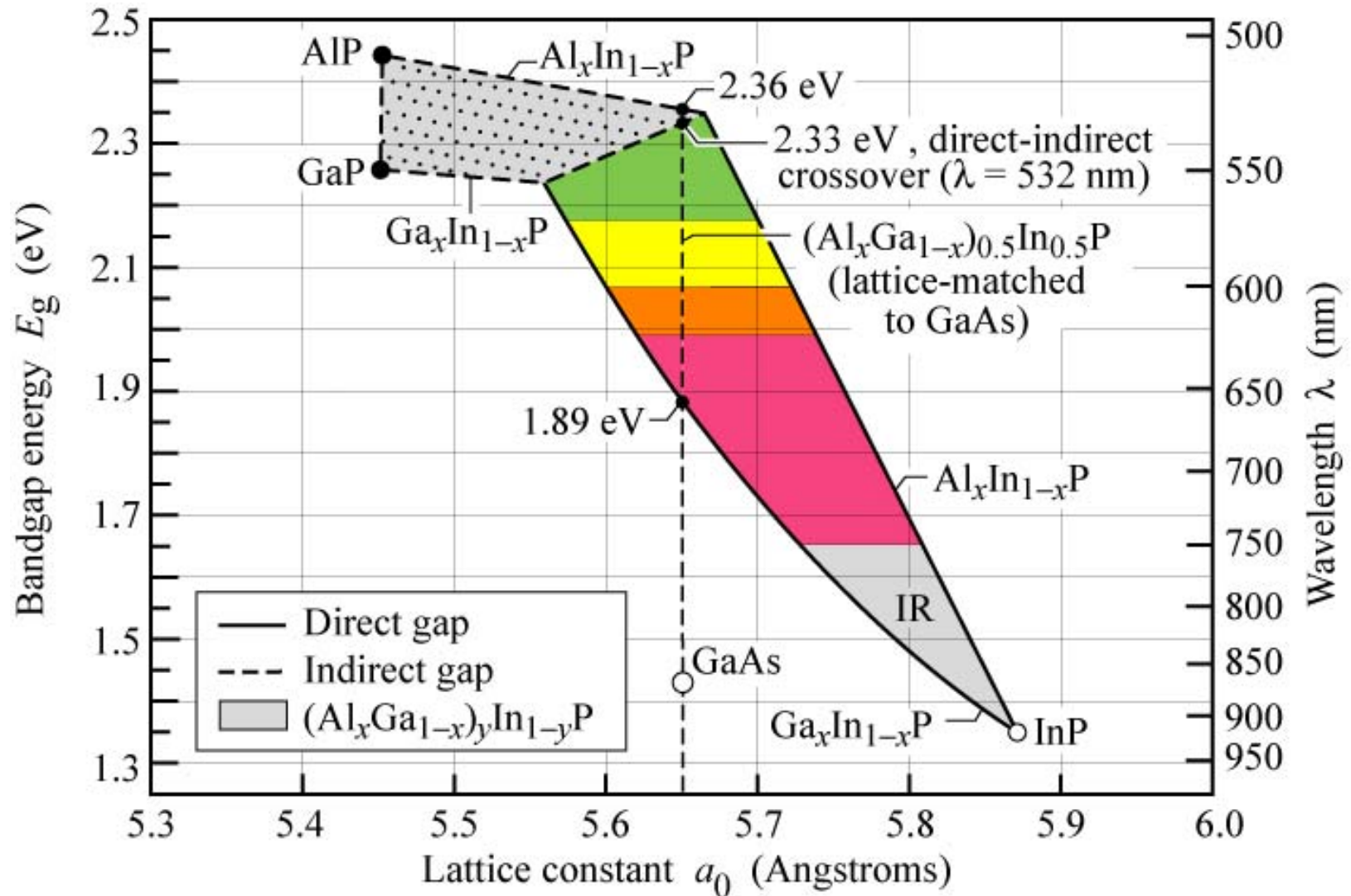


LED data from
E.F Schubert
"Light-emitting Diodes"
2nd Edition
Cambridge University Press, 2006

Bandgap-lattice constant for AlGaInP



Chromaticity diagram

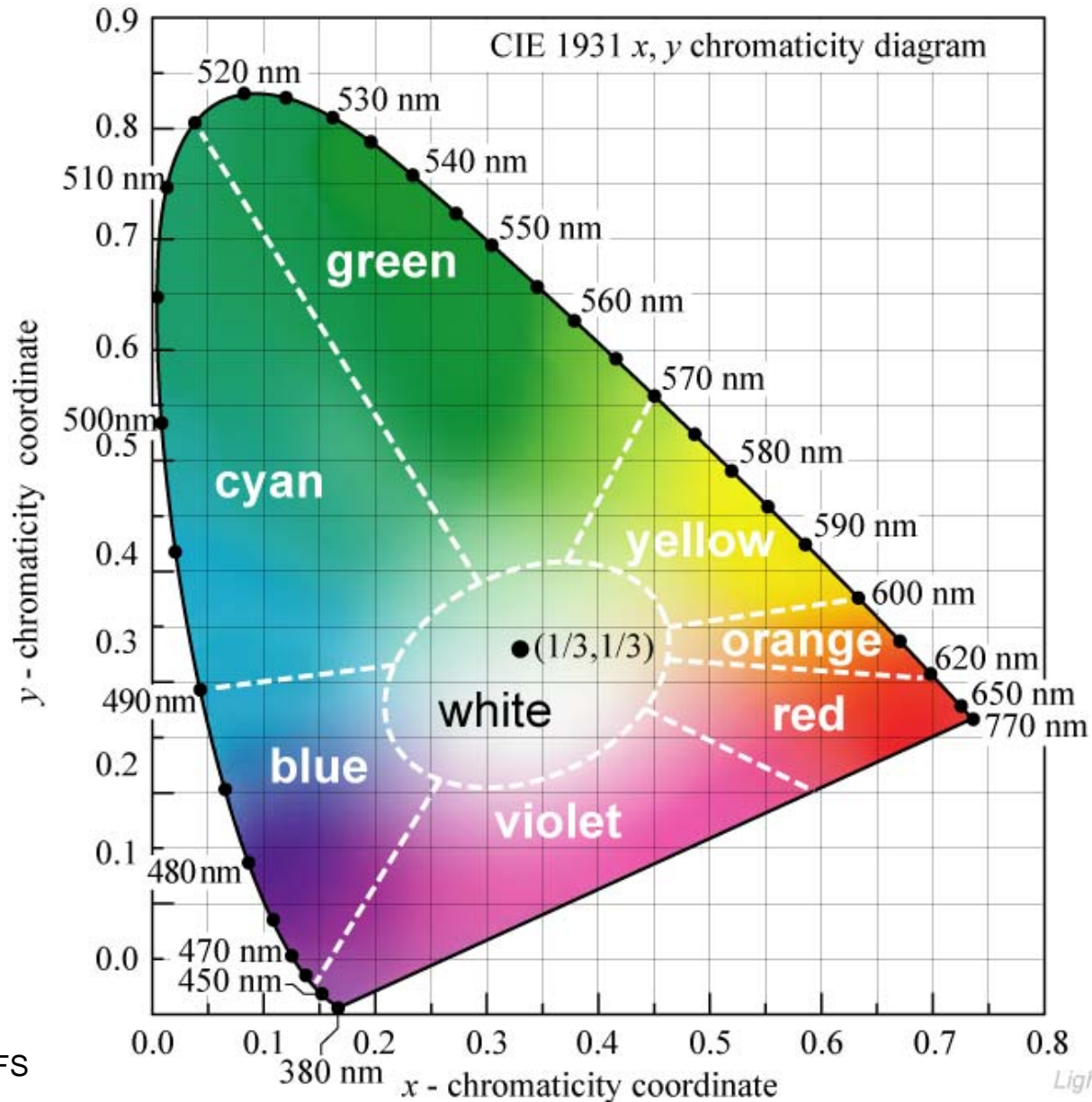


Fig. 17.4. CIE 1931 (x, y) chromaticity diagram. Monochromatic colors are located on the perimeter. Color saturation decreases towards the center of the diagram. White light is located in the center. Also shown are the regions of distinct colors. The equal-energy point is located at the center and has the coordinates $(x, y) = (1/3, 1/3)$.

Appendix 16.1

Tabulated values of the 2° degree CIE 1931 photopic eye sensitivity function and the CIE 1978 Judd-Vos-modified photopic eye sensitivity function for point sources (after CIE, 1931 and CIE, 1978).

λ (nm)	CIE 1931 $V(\lambda)$	CIE 1978 $V(\lambda)$			
			590	0.75700	0.75700
			595	0.69490	0.69483
			600	0.63100	0.63100
			605	0.56680	0.56654
			610	0.50300	0.50300
			615	0.44120	0.44172
			620	0.38100	0.38100
			625	0.32100	0.32052
			630	0.26500	0.26500
			635	0.21700	0.21702
			640	0.17500	0.17500
			645	0.13820	0.13812
			650	0.10700	0.1.0700
			655	8.1600 E-2	8.1652E-2
			660	6.1000 E-2	6.1000E-2
			665	4.4580 E-2	4.4327E-2
			670	3.2000 E-2	3.2000E-2
			675	2.3200 E-2	2.3454E-2
			680	1.7000 E-2	1.7000E-2
			685	1.1920 E-2	1.1872E-2
			690	8.2100 E-3	8.2100E-3
			695	5.7230 E-3	5.7723E-3
			700	4.1020 E-3	4.1020E-3
			705	2.9290 E-3	2.9291E-3
			710	2.0910 E-3	2.0910E-3
			715	1.4840 E-3	1.4822E-3
			720	1.0470 E-3	1.0470E-3
			725	7.4000 E-4	7.4015E-4
			730	5.2000 E-4	5.2000E-4
			735	3.6110 E-4	3.6093E-4
			740	2.4920 E-4	2.4920E-4
			745	1.7190 E-4	1.7231E-4
			750	1.2000 E-4	1.2000E-4
			755	8.4800 E-5	8.4620E-5
			760	6.0000 E-5	6.0000E-5
			765	4.2400 E-5	4.2446E-5
			770	3.0000 E-5	3.0000E-5
			775	2.1200 E-5	2.1210E-5
			780	1.4990 E-5	1.4989E-5
			785	1.0600 E-5	1.0584E-5
			790	7.4657 E-6	7.4656E-6
			795	5.2578 E-6	5.2592E-6
			800	3.7029 E-6	3.7028E-6
			805	2.6078 E-6	2.6076E-6
			810	1.8366 E-6	1.8365E-6
			815	1.2934 E-6	1.2950E-6
			820	9.1093 E-7	9.1092E-7
			825	6.4153 E-7	6.3564E-7
360	3.9170 E-6	0.0000E-4			
365	6.9650 E-6	0.0000E-4			
370	1.2390 E-5	0.0000E-4			
375	2.2020 E-5	0.0000E-4			
380	3.9000 E-5	2.0000E-4			
385	6.4000 E-5	3.9556E-4			
390	1.2000 E-4	8.0000E-4			
395	2.1700 E-4	1.5457E-3			
400	3.9600 E-4	2.8000E-3			
405	6.4000 E-4	4.6562E-3			
410	1.2100 E-3	7.4000E-3			
415	2.1800 E-3	1.1779E-2			
420	4.0000 E-3	1.7500E-2			
425	7.3000 E-3	2.2678E-2			
430	1.1600 E-2	2.7300E-2			
435	1.6840 E-2	3.2584E-2			
440	2.3000 E-2	3.7900E-2			
445	2.9800 E-2	4.2391E-2			
450	3.8000 E-2	4.6800E-2			
455	4.8000 E-2	5.2122E-2			
460	6.0000 E-2	6.0000E-2			
465	7.3900 E-2	7.2942E-2			
470	9.0980 E-2	9.0980E-2			
475	0.11260	0.11284			
480	0.13902	0.13902			
485	0.16930	0.16987			
490	0.20802	0.20802			
495	0.25860	0.25808			
500	0.32300	0.32300			
505	0.40730	0.40540			
510	0.50300	0.50300			
515	0.60820	0.60811			
520	0.71000	0.71000			
525	0.79320	0.79510			
530	0.86200	0.86200			
535	0.91485	0.91505			
540	0.95400	0.95400			
545	0.98030	0.98004			
550	0.99495	0.99495			
555	1.00000	1.00000			
560	0.99500	0.99500			
565	0.97860	0.97875			
570	0.95200	0.95200			
575	0.91540	0.91558			
580	0.87000	0.87000			
585	0.81630	0.81623			

Appendix 17.2

Tabulated values of the CIE 1978 two-degree color-matching functions and eye sensitivity function for point sources (after CIE, 1978). The functions are also called the Judd-Vos-modified color-matching functions.

λ (nm)	$\bar{x}(\lambda)$ <i>red</i>	$\bar{y} = V(\lambda)$ <i>green</i>	$\bar{z}(\lambda)$ <i>blue</i>				
380	2.6899E-3	2.0000E-4	1.2260E-2	600	1.0550	6.3100E-1	9.0564E-4
385	5.3105E-3	3.9556E-4	2.4222E-2	605	1.0362	5.6654E-1	6.9467E-4
390	1.0781E-2	8.0000E-4	4.9250E-2	610	9.9239E-1	5.0300E-1	4.2885E-4
395	2.0792E-2	1.5457E-3	9.5135E-2	615	9.2861E-1	4.4172E-1	3.1817E-4
400	3.7981E-2	2.8000E-3	1.7409E-1	620	8.4346E-1	3.8100E-1	2.5598E-4
405	6.3157E-2	4.6562E-3	2.9013E-1	625	7.3983E-1	3.2052E-1	1.5679E-4
410	9.9941E-2	7.4000E-3	4.6053E-1	630	6.3289E-1	2.6500E-1	9.7694E-5
415	1.5824E-1	1.1779E-2	7.3166E-1	635	5.3351E-1	2.1702E-1	6.8944E-5
420	2.2948E-1	1.7500E-2	1.0658	640	4.4062E-1	1.7500E-1	5.1165E-5
425	2.8108E-1	2.2678E-2	1.3146	645	3.5453E-1	1.3812E-1	3.6016E-5
430	3.1095E-1	2.7300E-2	1.4672	650	2.7862E-1	1.0700E-1	2.4238E-5
435	3.3072E-1	3.2584E-2	1.5796	655	2.1485E-1	8.1652E-2	1.6915E-5
440	3.3336E-1	3.7900E-2	1.6166	660	1.6161E-1	6.1000E-2	1.1906E-5
445	3.1672E-1	4.2391E-2	1.5682	665	1.1820E-1	4.4327E-2	8.1489E-6
450	2.8882E-1	4.6800E-2	1.4717	670	8.5753E-2	3.2000E-2	5.6006E-6
455	2.5969E-1	5.2122E-2	1.3740	675	6.3077E-2	2.3454E-2	3.9544E-6
460	2.3276E-1	6.0000E-2	1.2917	680	4.5834E-2	1.7000E-2	2.7912E-6
465	2.0999E-1	7.2942E-2	1.2356	685	3.2057E-2	1.1872E-2	1.9176E-6
470	1.7476E-1	9.0980E-2	1.1138	690	2.2187E-2	8.2100E-3	1.3135E-6
475	1.3287E-1	1.1284E-1	9.4220E-1	695	1.5612E-2	5.7723E-3	9.1519E-7
480	9.1944E-2	1.3902E-1	7.5596E-1	700	1.1098E-2	4.1020E-3	6.4767E-7
485	5.6985E-2	1.6987E-1	5.8640E-1	705	7.9233E-3	2.9291E-3	4.6352E-7
490	3.1731E-2	2.0802E-1	4.4669E-1	710	5.6531E-3	2.0910E-3	3.3304E-7
495	1.4613E-2	2.5808E-1	3.4116E-1	715	4.0039E-3	1.4822E-3	2.3823E-7
500	4.8491E-3	3.2300E-1	2.6437E-1	720	2.8253E-3	1.0470E-3	1.7026E-7
505	2.3215E-3	4.0540E-1	2.0594E-1	725	1.9947E-3	7.4015E-4	1.2207E-7
510	9.2899E-4	5.0300E-1	1.5445E-1	730	1.3994E-3	5.2000E-4	8.7107E-8
515	2.9278E-4	6.0811E-1	1.0918E-1	735	9.6980E-4	3.6093E-4	6.1455E-8
520	6.3791E-5	7.1000E-1	7.6585E-2	740	6.6847E-4	2.4920E-4	4.3162E-8
525	1.1081E-1	7.9510E-1	5.6227E-2	745	4.6141E-4	1.7231E-4	3.0379E-8
530	1.6692E-1	8.6200E-1	4.1366E-2	750	3.2073E-4	1.2000E-4	2.1554E-8
535	2.2768E-1	9.1505E-1	2.9353E-2	755	2.2573E-4	8.4620E-5	1.5493E-8
540	2.9269E-1	9.5400E-1	2.0042E-2	760	1.5973E-4	6.0000E-5	1.1204E-8
545	3.6225E-1	9.8004E-1	1.3312E-2	765	1.1275E-4	4.2446E-5	8.0873E-9
550	4.3635E-1	9.9495E-1	8.7823E-3	770	7.9513E-5	3.0000E-5	5.8340E-9
555	5.1513E-1	1.0000	5.8573E-3	775	5.6087E-5	2.1210E-5	4.2110E-9
560	5.9748E-1	9.9500E-1	4.0493E-3	780	3.9541E-5	1.4989E-5	3.0383E-9
565	6.8121E-1	9.7875E-1	2.9217E-3	785	2.7852E-5	1.0584E-5	2.1907E-9
570	7.6425E-1	9.5200E-1	2.2771E-3	790	1.9597E-5	7.4656E-6	1.5778E-9
575	8.4394E-1	9.1558E-1	1.9706E-3	795	1.3770E-5	5.2592E-6	1.1348E-9
580	9.1635E-1	8.7000E-1	1.8066E-3	800	9.6700E-6	3.7028E-6	8.1565E-10
585	9.7703E-1	8.1623E-1	1.5449E-3	805	6.7918E-6	2.6076E-6	5.8626E-10
590	1.0230	7.5700E-1	1.2348E-3	810	4.7706E-6	1.8365E-6	4.2138E-10
595	1.0513	6.9483E-1	1.1177E-3	815	3.3550E-6	1.2950E-6	3.0319E-10
				820	2.3534E-6	9.1092E-7	2.1753E-10
				825	1.6377E-6	6.3564E-7	1.5476E-10

Appendix 18.1

Color temperature T and (x, y) and (u', v') chromaticity coordinates of a planckian emitter.

T	x	y	u'	v'
1 000 K	0.649	0.347	0.443	0.533
1 200 K	0.623	0.370	0.402	0.538
1 400 K	0.597	0.389	0.369	0.541
1 600 K	0.572	0.402	0.342	0.542
1 800 K	0.549	0.412	0.321	0.542
2 000 K	0.527	0.417	0.303	0.540
2 200 K	0.506	0.420	0.288	0.538
2 400 K	0.487	0.419	0.276	0.535
2 600 K	0.470	0.417	0.266	0.531
2 800 K	0.454	0.414	0.257	0.528
3 000 K	0.439	0.409	0.250	0.524
3 200 K	0.425	0.404	0.243	0.520
3 400 K	0.413	0.399	0.237	0.516
3 600 K	0.402	0.393	0.233	0.512
3 800 K	0.392	0.388	0.228	0.508
4 000 K	0.383	0.382	0.225	0.504
4 200 K	0.374	0.376	0.221	0.500
4 400 K	0.367	0.371	0.218	0.497
4 600 K	0.360	0.366	0.216	0.494
4 800 K	0.353	0.361	0.213	0.490
5 000 K	0.347	0.356	0.211	0.487
5 200 K	0.342	0.351	0.209	0.484
5 400 K	0.337	0.347	0.208	0.481
5 600 K	0.332	0.343	0.206	0.479
5 800 K	0.328	0.339	0.205	0.476
6 000 K	0.324	0.335	0.203	0.473
6 200 K	0.321	0.332	0.202	0.471
6 400 K	0.317	0.328	0.201	0.469
6 500 K	0.315	0.327	0.201	0.468
6 600 K	0.314	0.325	0.200	0.466
6 800 K	0.311	0.322	0.199	0.464
7 000 K	0.308	0.319	0.198	0.462
7 200 K	0.306	0.317	0.198	0.460
7 400 K	0.303	0.314	0.197	0.459
7 600 K	0.301	0.312	0.196	0.457
7 800 K	0.299	0.309	0.196	0.455
8 000 K	0.297	0.307	0.195	0.454
8 500 K	0.292	0.301	0.194	0.450
9 000 K	0.289	0.297	0.193	0.447
9 500 K	0.285	0.293	0.192	0.444
10 000 K	0.282	0.290	0.191	0.441