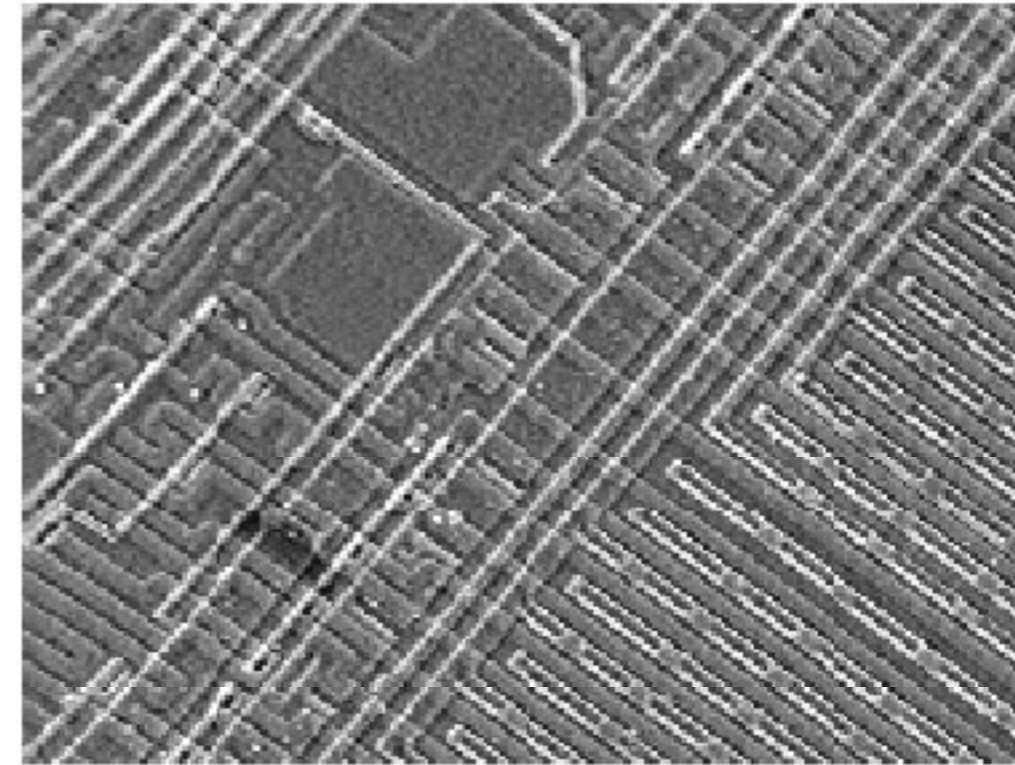


7) Halbleiter

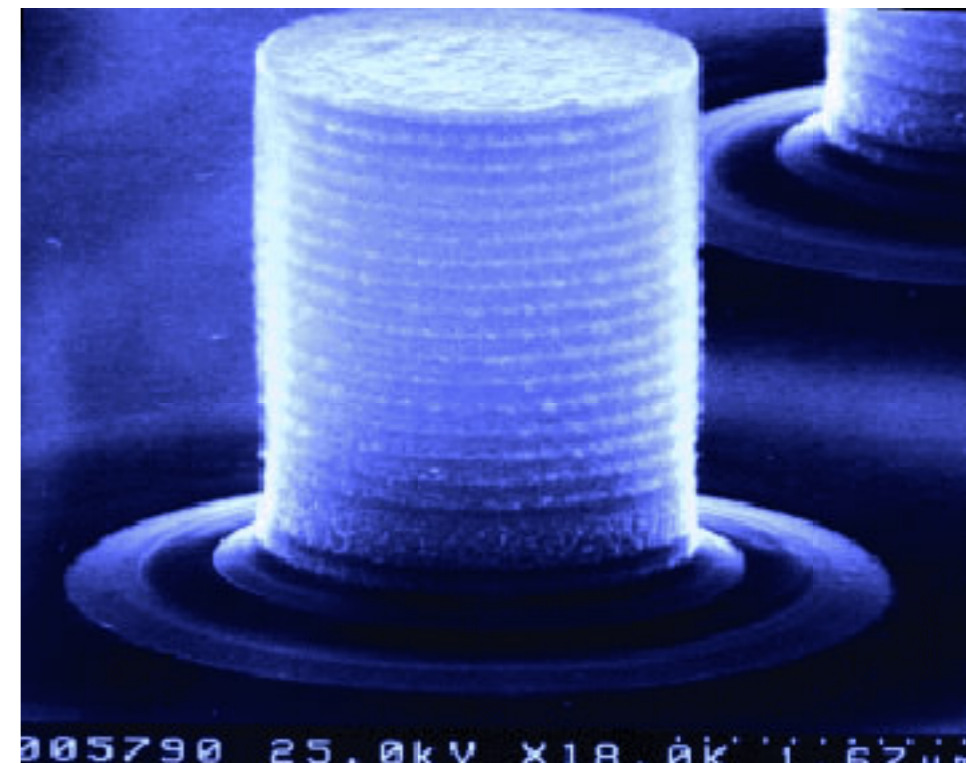
Transistor



Mikroelektronik

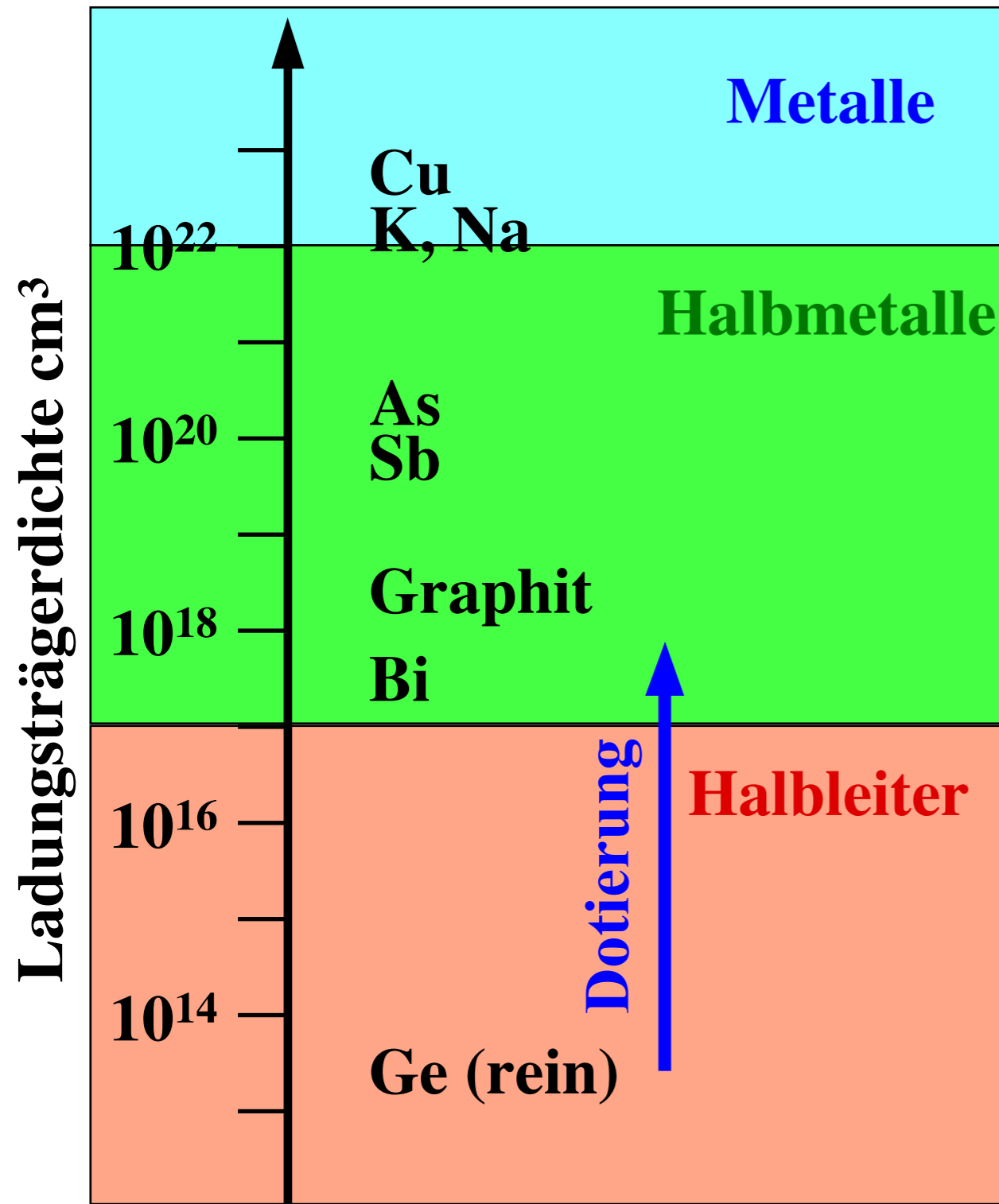


Optoelektronik

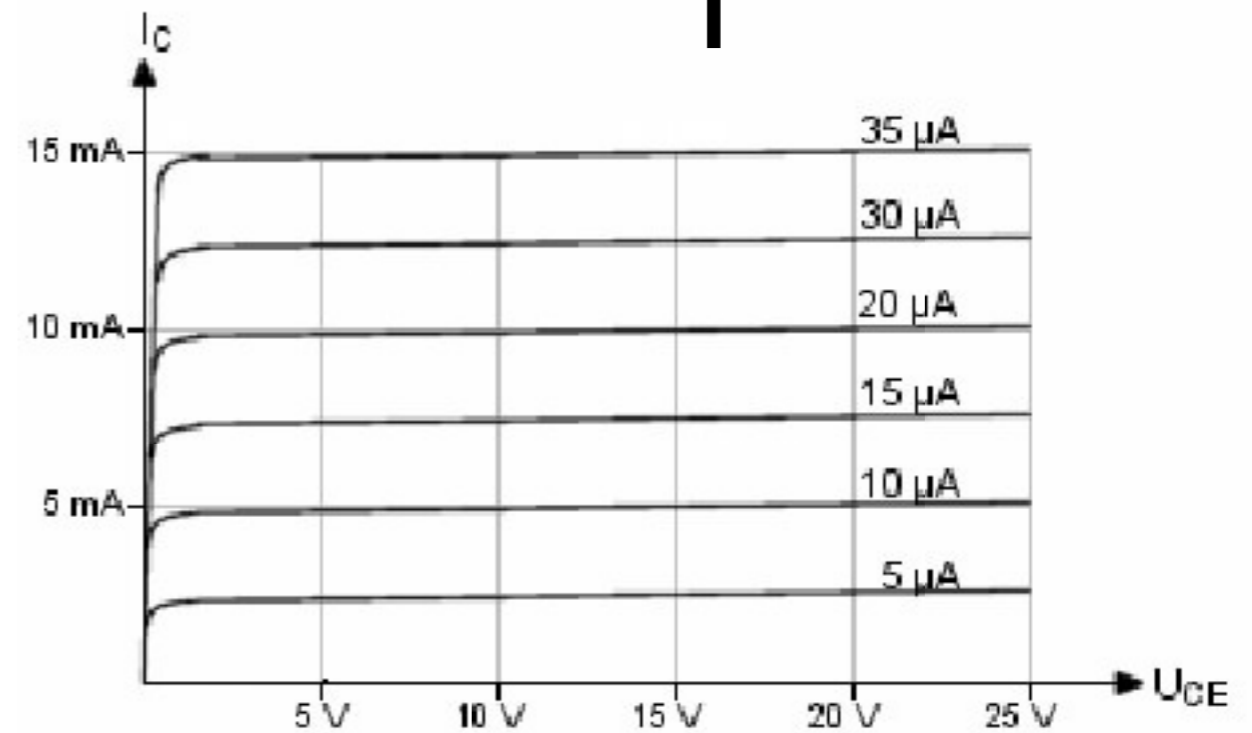
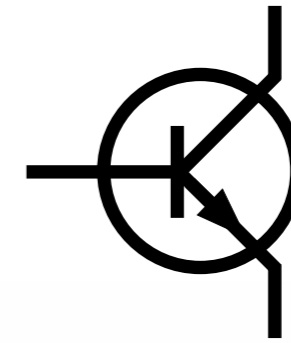


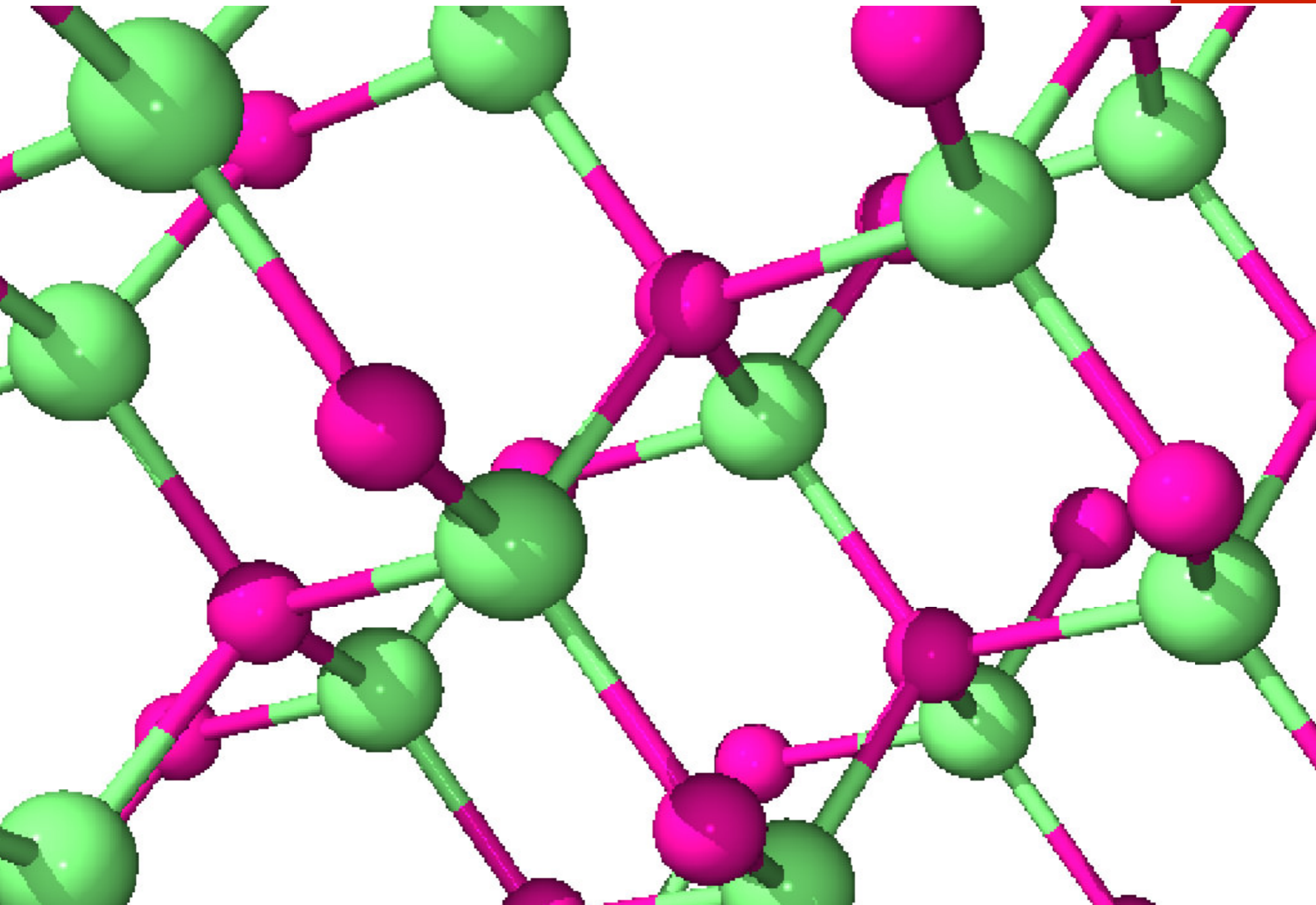
Halbleiter

Beeinflussung durch elektrische Felder und Ströme



Transistorkennlinie

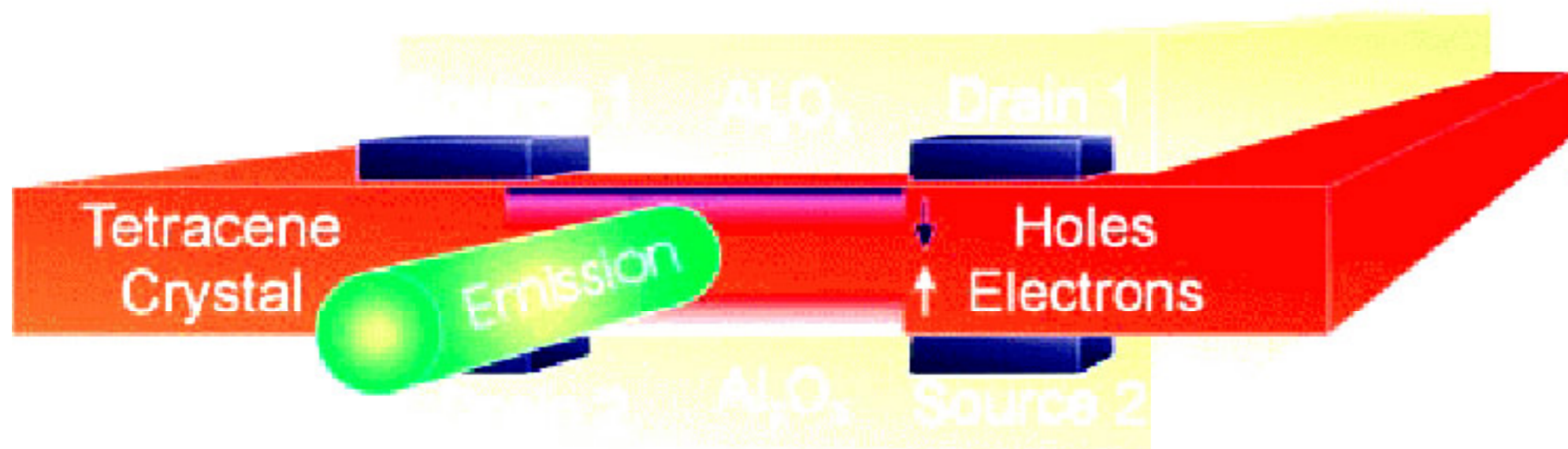
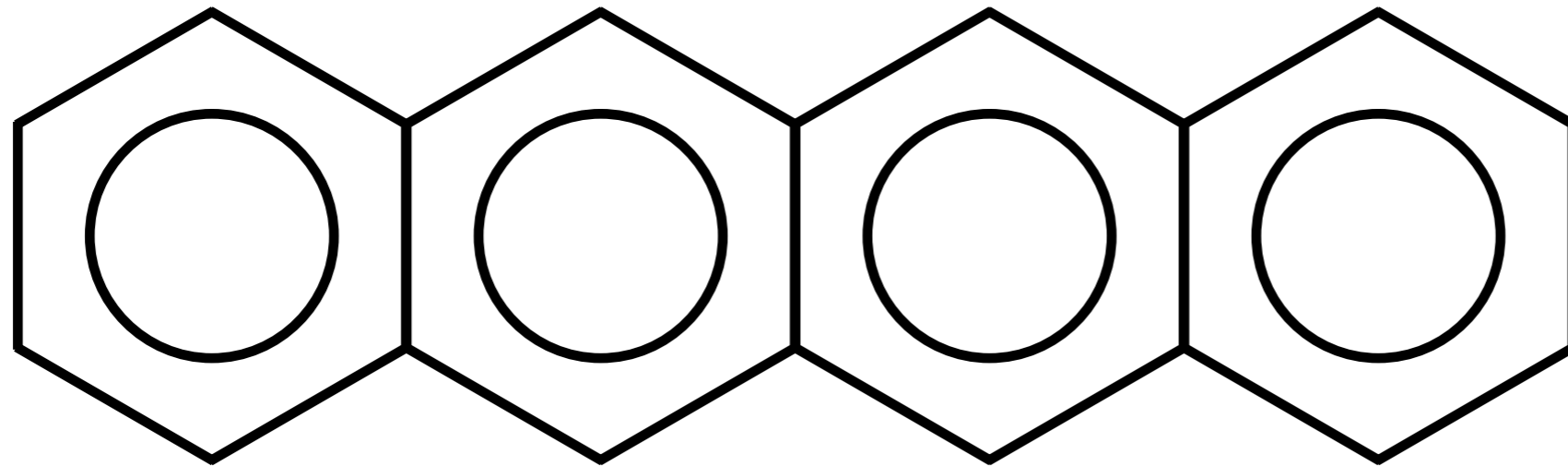




Organische Halbleiter

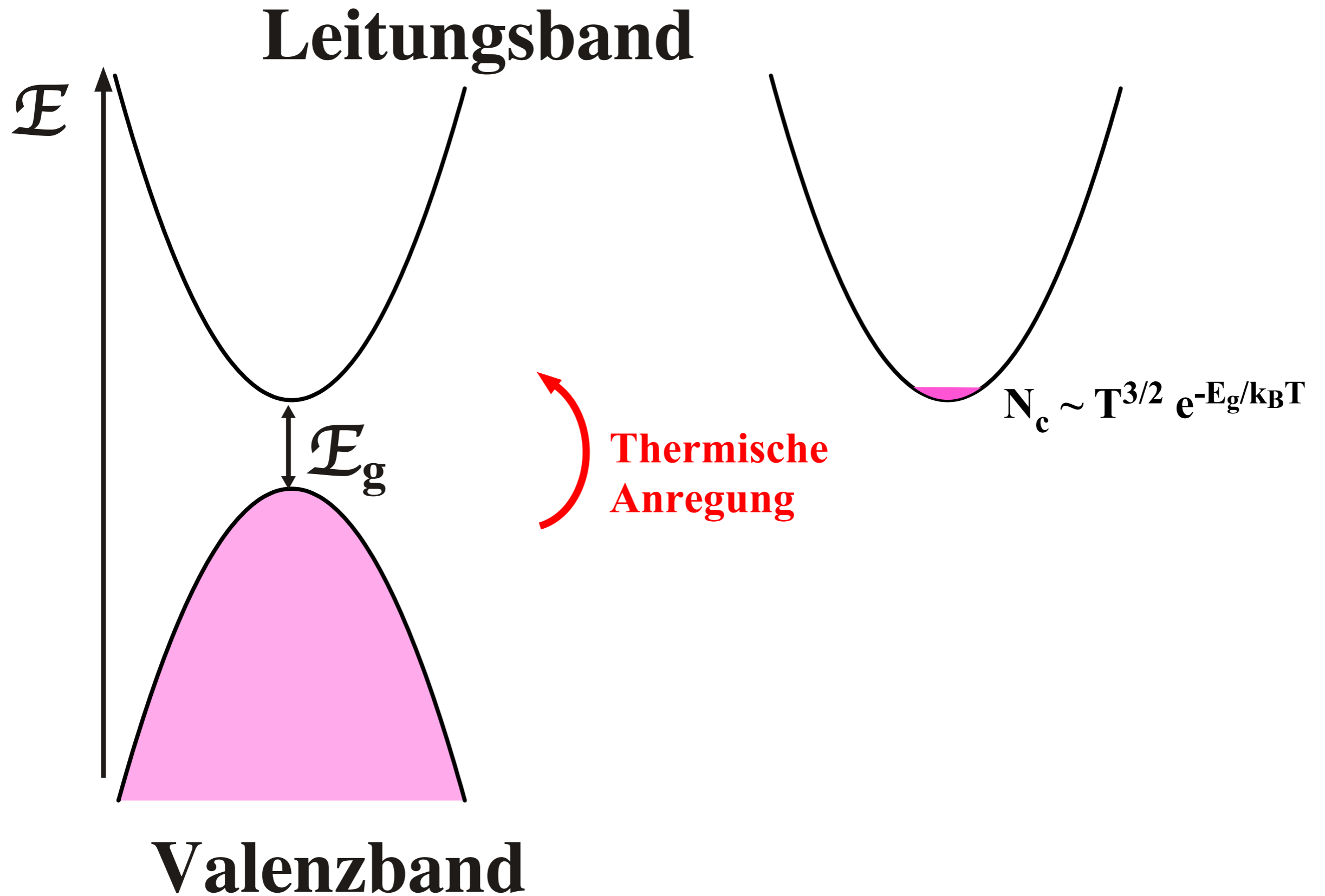
z.B.

Tetrazen



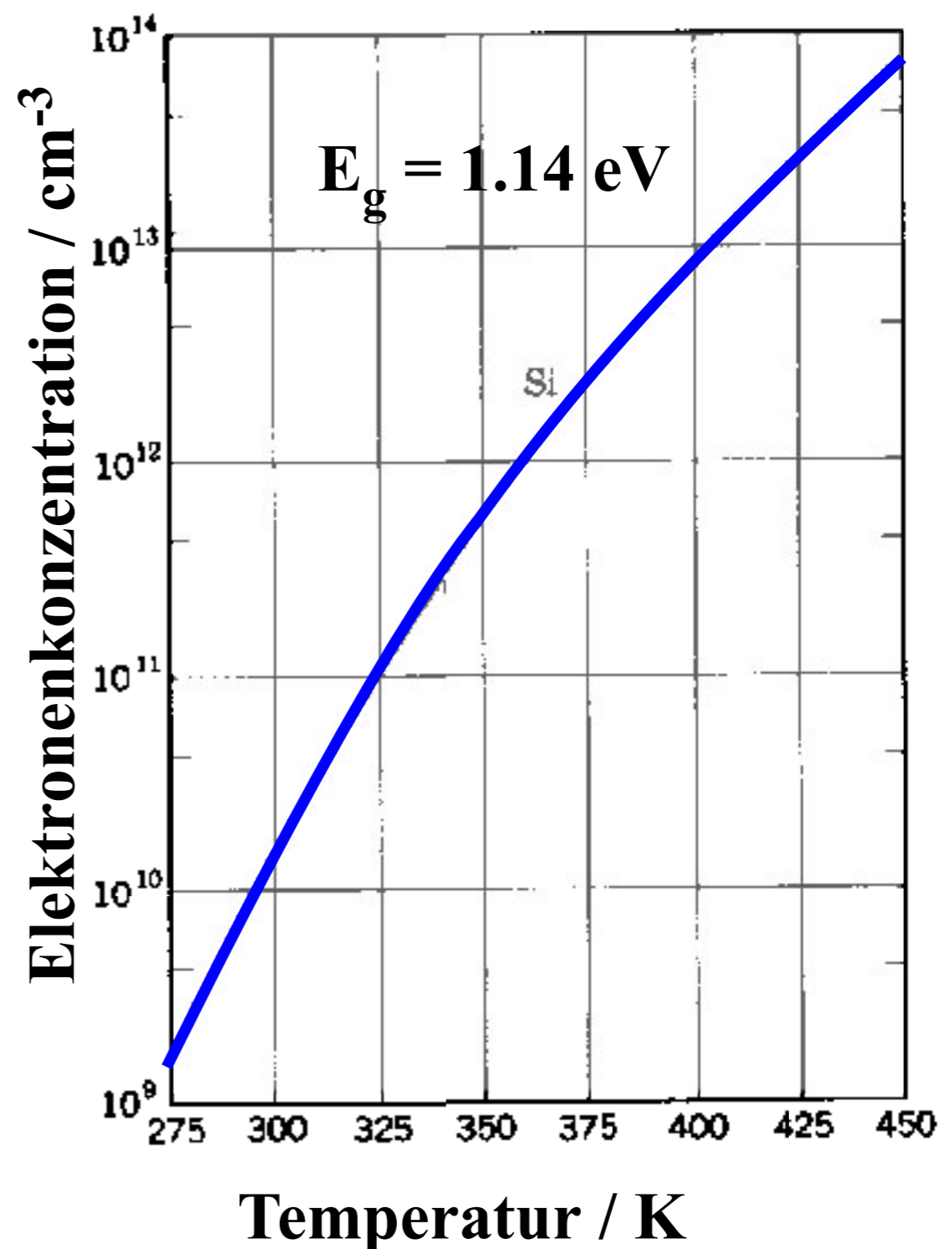
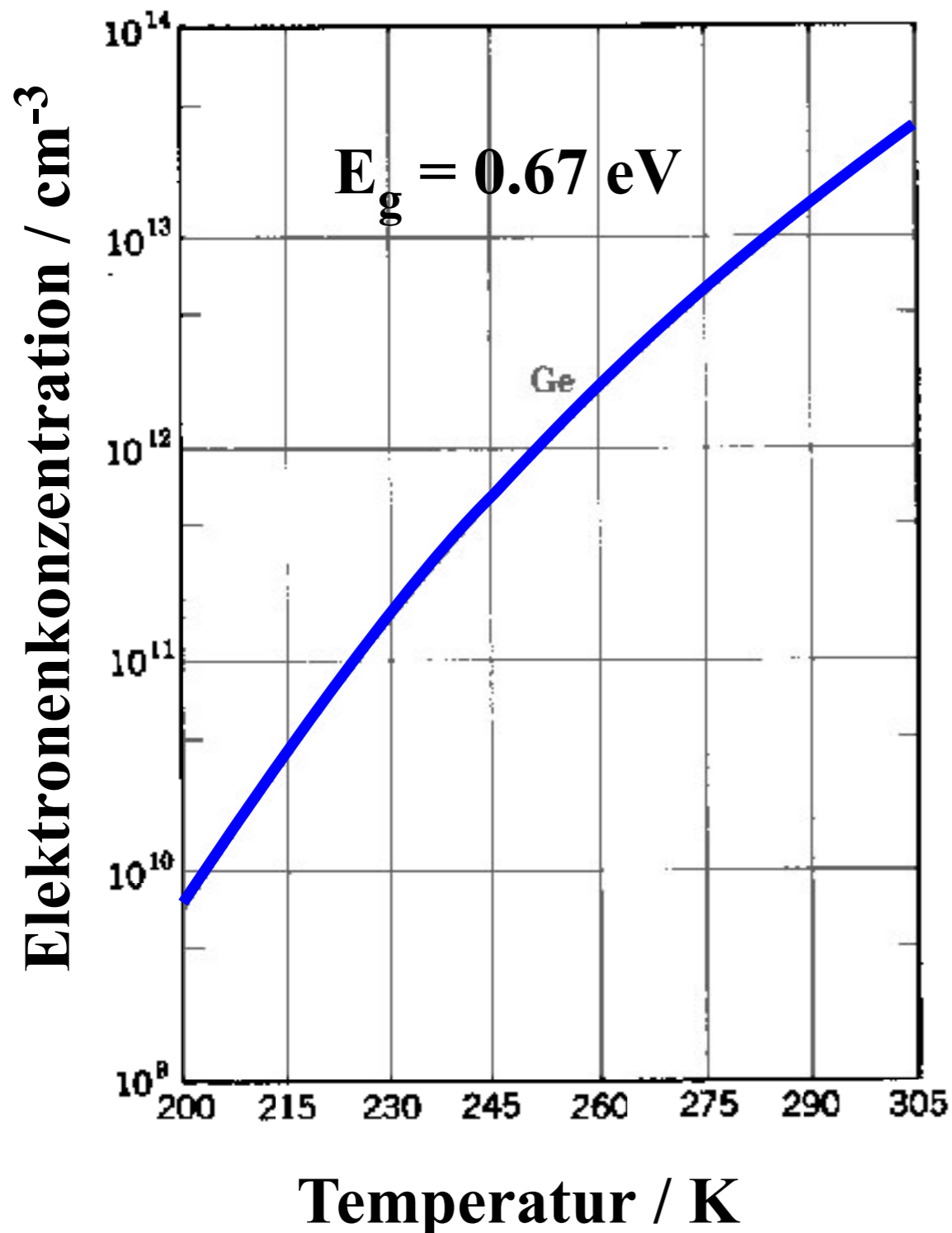
J.H. Schön, C. Kloc, A. Dodabalapur, and B. Batlogg, 'An Organic Solid State Injection Laser', *Science* 289, 599-601 (2000).

Bandlücke



Ladungsträgerkonzentration

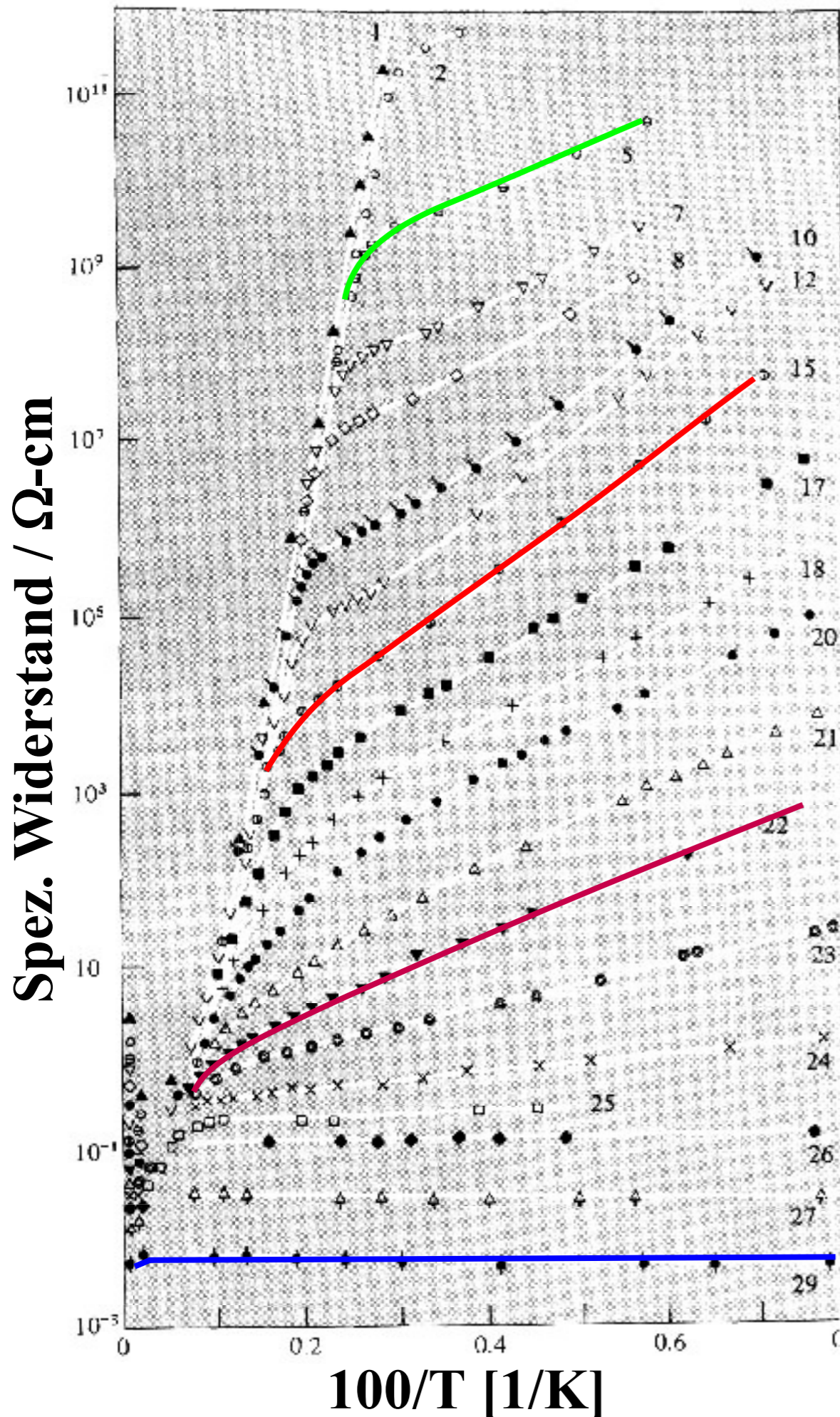
Temperaturabhängigkeit der Ladungsträgerkonzentration



Bandlücken

Kristall	Lücke	E_g, eV		Kristall	Lücke	E_g, eV	
		0 K	300 K			0 K	300 K
Diamant	<i>i</i>	5,4					
Si	<i>i</i>	1,17	1,14	PbS	<i>d</i>	0,286	0,34 – 0,37
Ge	<i>i</i>	0,744	0,67	PbSe	<i>d</i>	0,165	0,27
α Sn	<i>d</i>	0,00	0,00	PbTe	<i>d</i>	0,190	0,30
InSb	<i>d</i>	0,24	0,18	CdS	<i>d</i>	2,582	2,42
InAs	<i>d</i>	0,43	0,35	CdSe	<i>d</i>	1,840	1,74
InP	<i>d</i>	1,42	1,35	CdTe	<i>d</i>	1,607	1,45
GaP	<i>i</i>	2,32	2,26	ZnO		3,436	3,2
GaAs	<i>d</i>	1,52	1,43	ZnS		3,91	3,6
GaSb	<i>d</i>	0,81	0,87	SnTe	<i>d</i>	0,3	0,18
AlSb	<i>i</i>	1,65	1,52	AgCl		—	3,2
SiC (hex)		3,0	—	AgI		—	2,8
Te	<i>d</i>	0,33	—	Cu ₂ O		2,172	—
ZnSb		0,56	0,56	TiO ₂		3,03	—

Dotierung

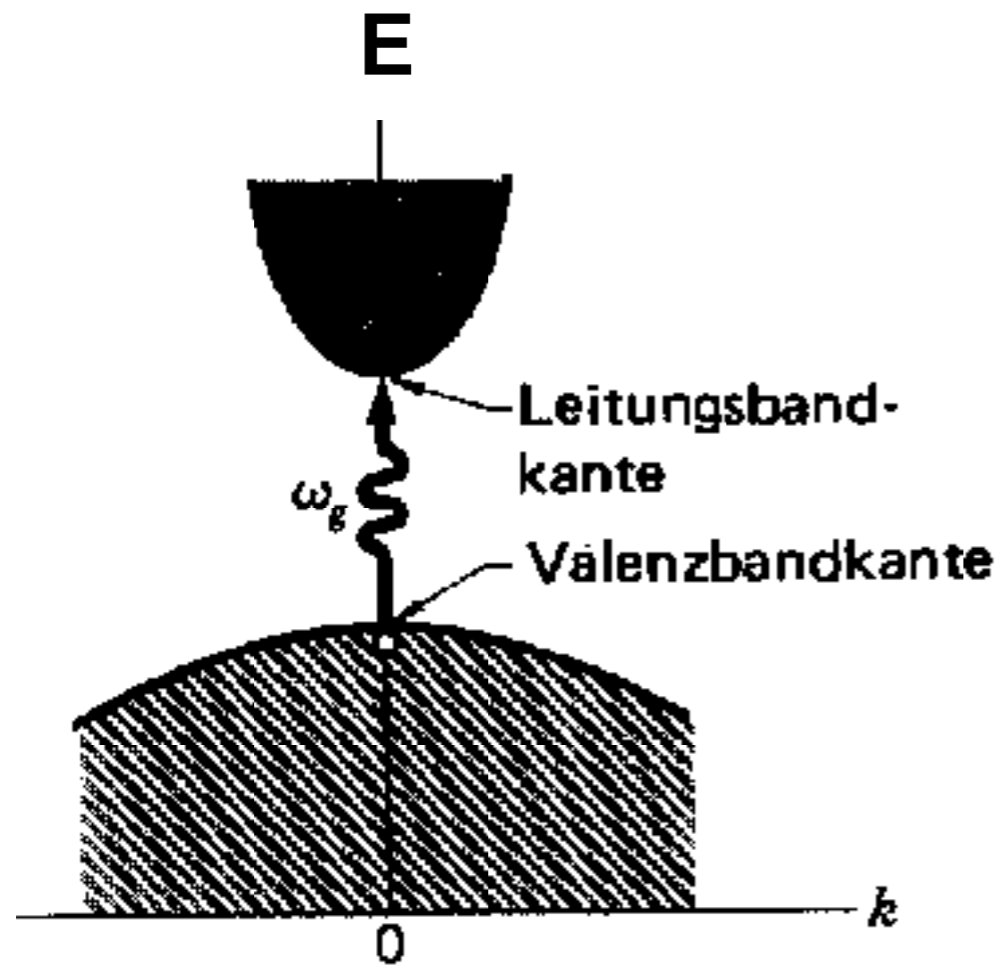


Specimen	Donor concentration (cm^{-3})
1	5.3×10^{14}
2	9.3×10^{14}
5	1.6×10^{15}
7	2.3×10^{15}
8	3.0×10^{15}
10	5.2×10^{15}
12	8.5×10^{15}
15	1.3×10^{16}
17	2.4×10^{16}
18	3.5×10^{16}
20	4.5×10^{16}
21	5.5×10^{16}
22	6.4×10^{16}
23	7.4×10^{16}
24	8.4×10^{16}
25	1.2×10^{17}
26	1.3×10^{17}
27	2.7×10^{17}
29	9.5×10^{17}

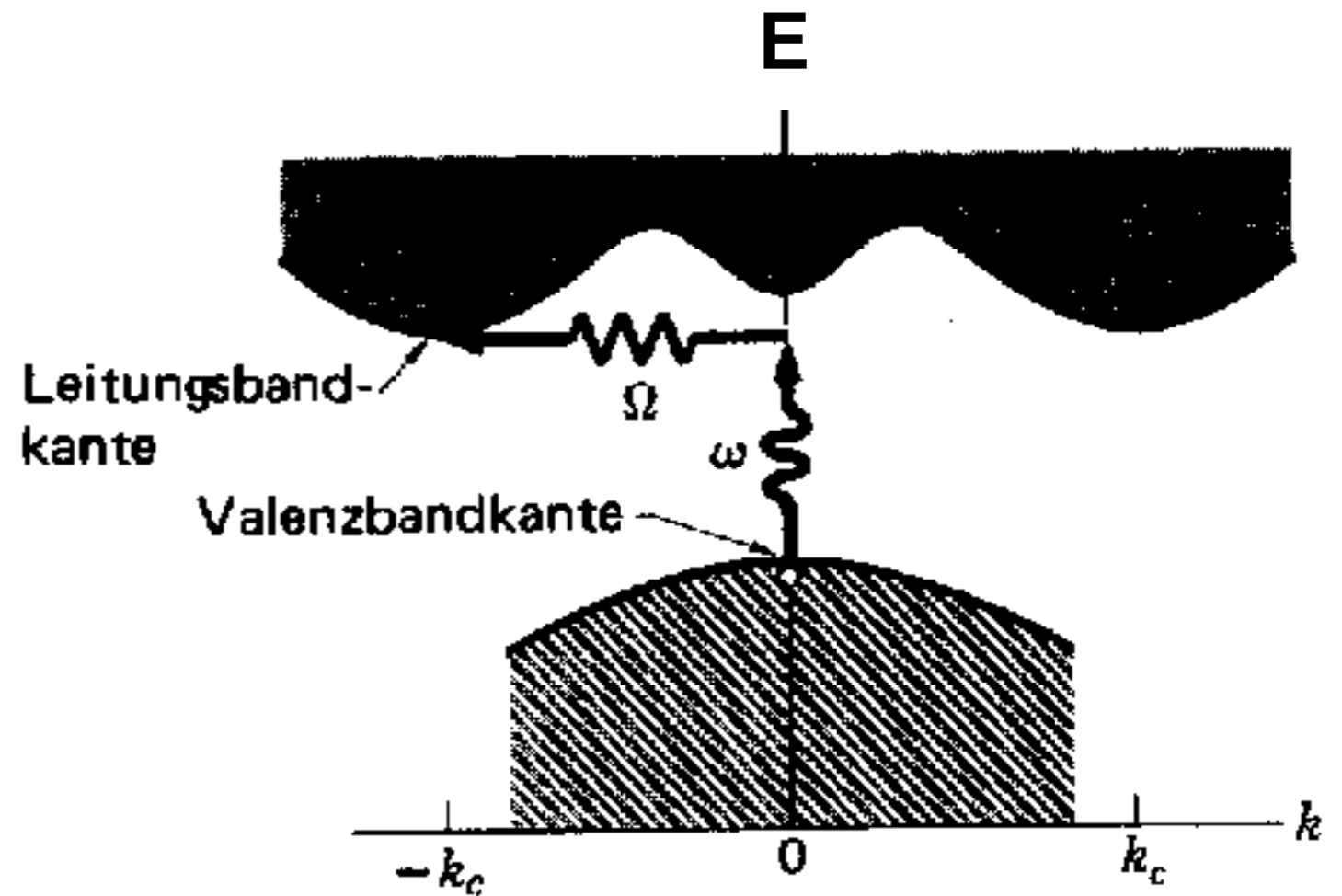
N.W. Ashcroft and N.D. Mermin, 'Solid state physics',
Holt, Rinehart and Winston, New York (1976).

Direkte und indirekte Halbleiter

direkte Halbleiter

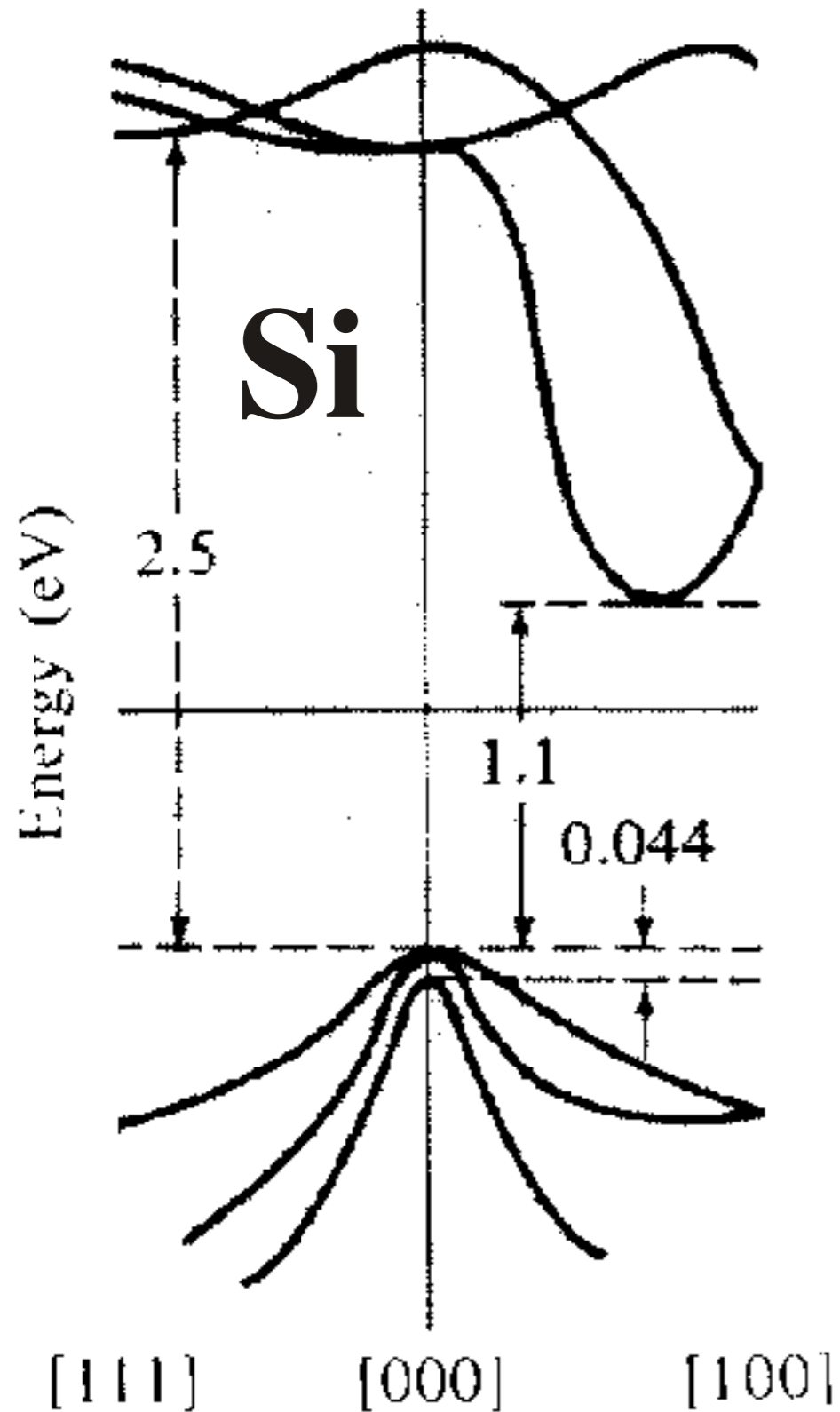


indirekte Halbleiter



Impulserhaltung

indirekter HL



direkter HL

