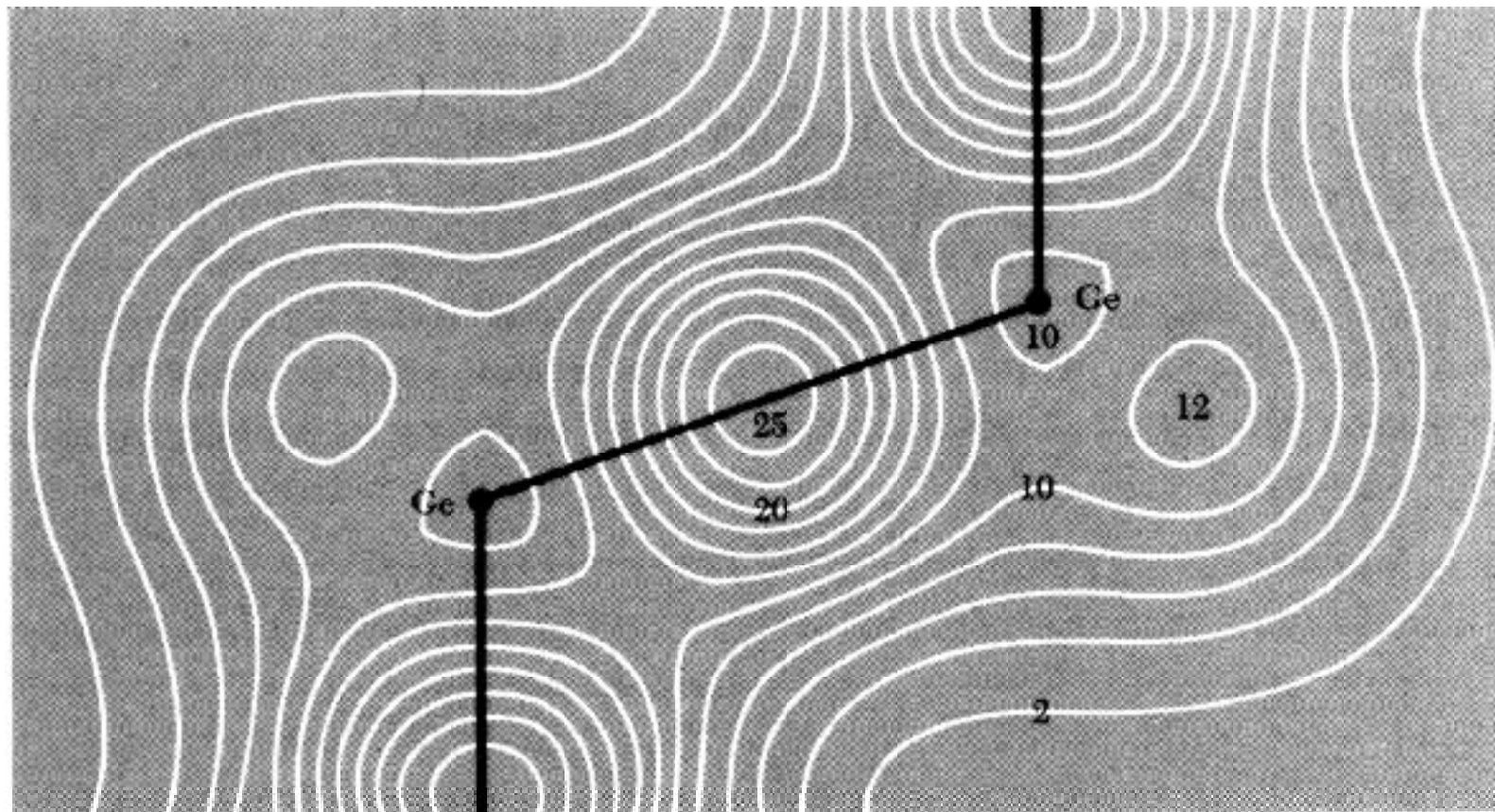
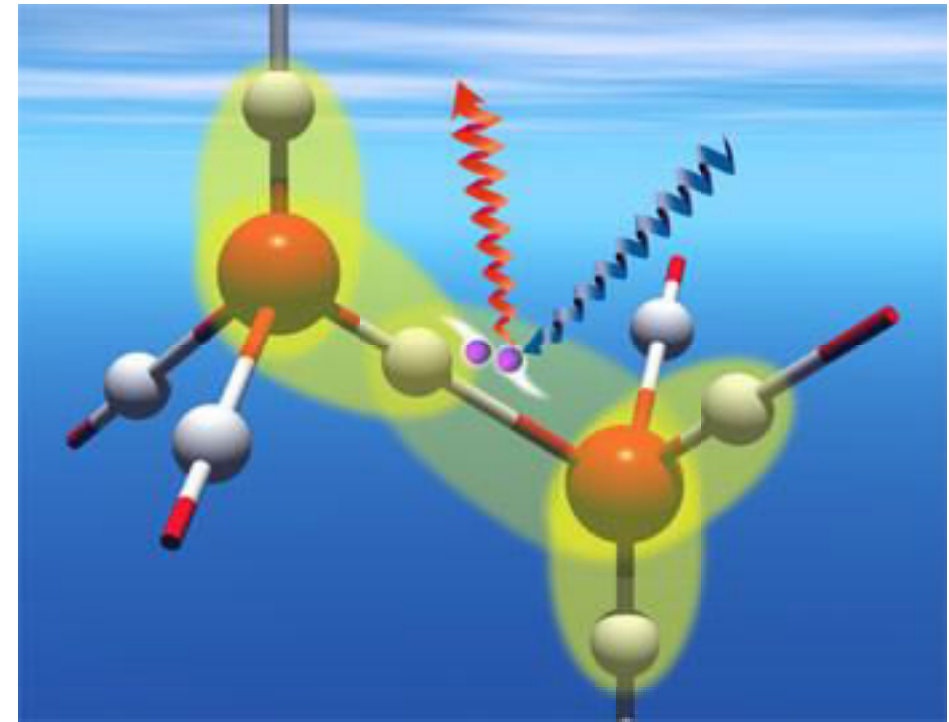


3) Bindungen im Festkörper

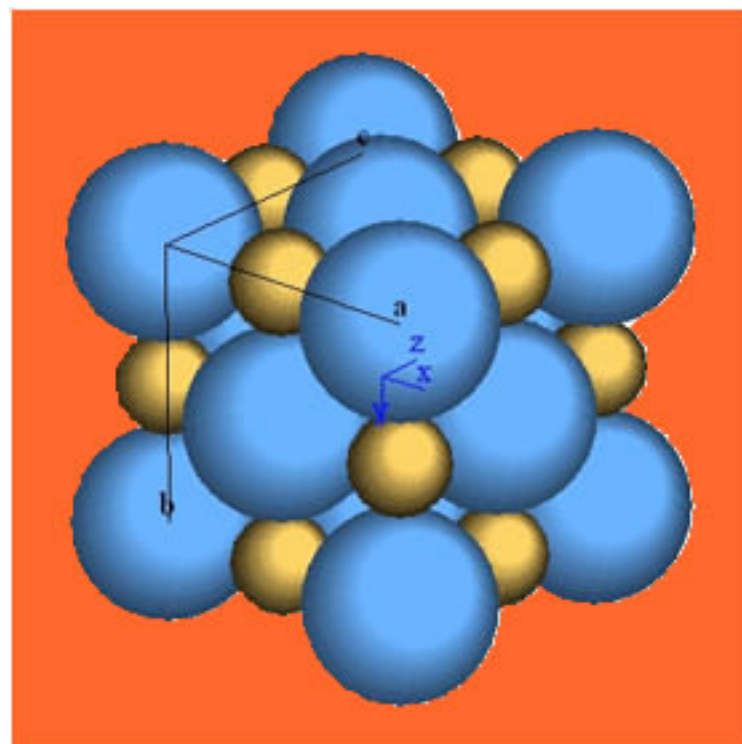
Kovalente Bindung in Ge



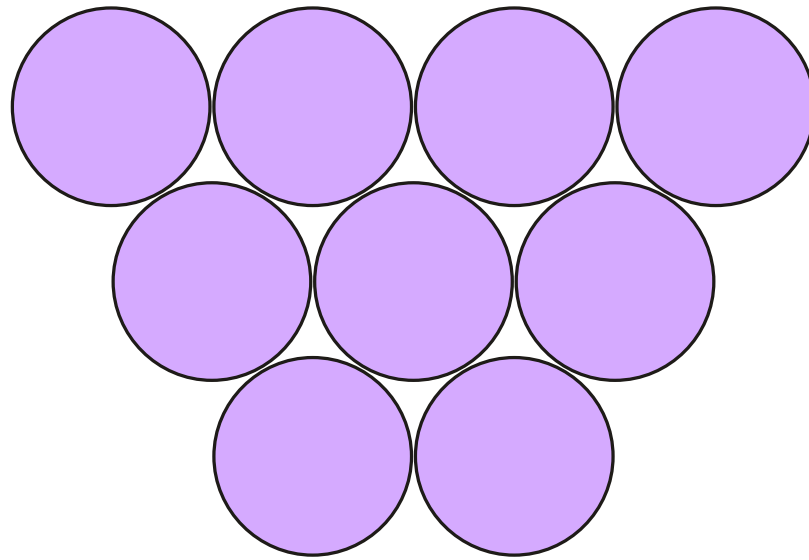
Wasserstoffbrücke in H₂O



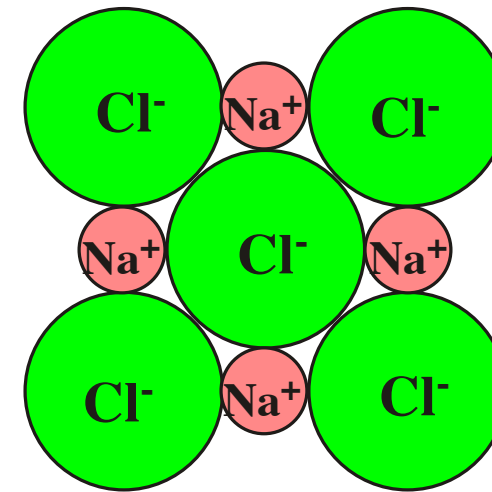
Ionische Bindung in NaCl



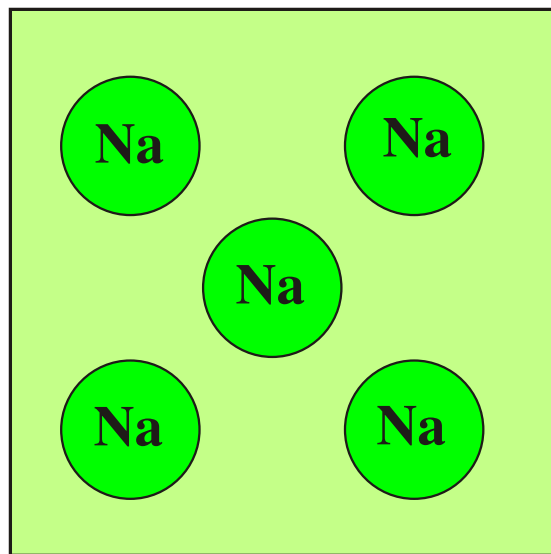
Bindungsarten



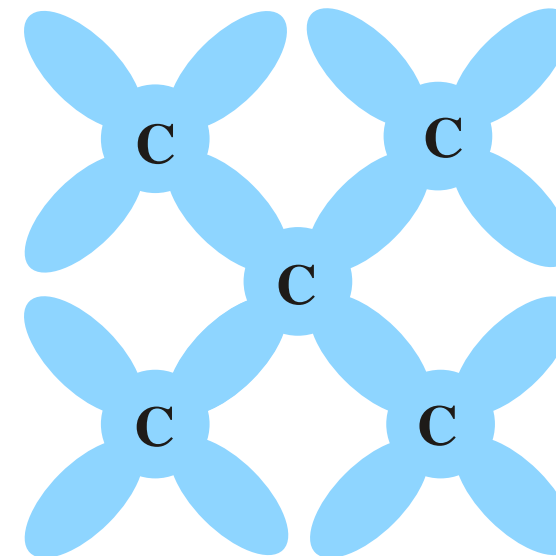
Van der Waals (Ar)



Ionisch (NaCl)



Metallisch (Na)



Kovalent (Diamant)

Bindungstypen

Typ	Beispiel	Bindungsenergie / kcal/Mol	Konstituenten
ionisch	NaCl	180	Na ⁺ , Cl ⁻
kovalent	Diamant	170	C
metallisch	Na	26	Na
van der Waals	CH ₄	2.4	CH ₄
Wasserstoff- brücken	H ₂ O	12	H ₂ O

Bindungsenergie der Elemente

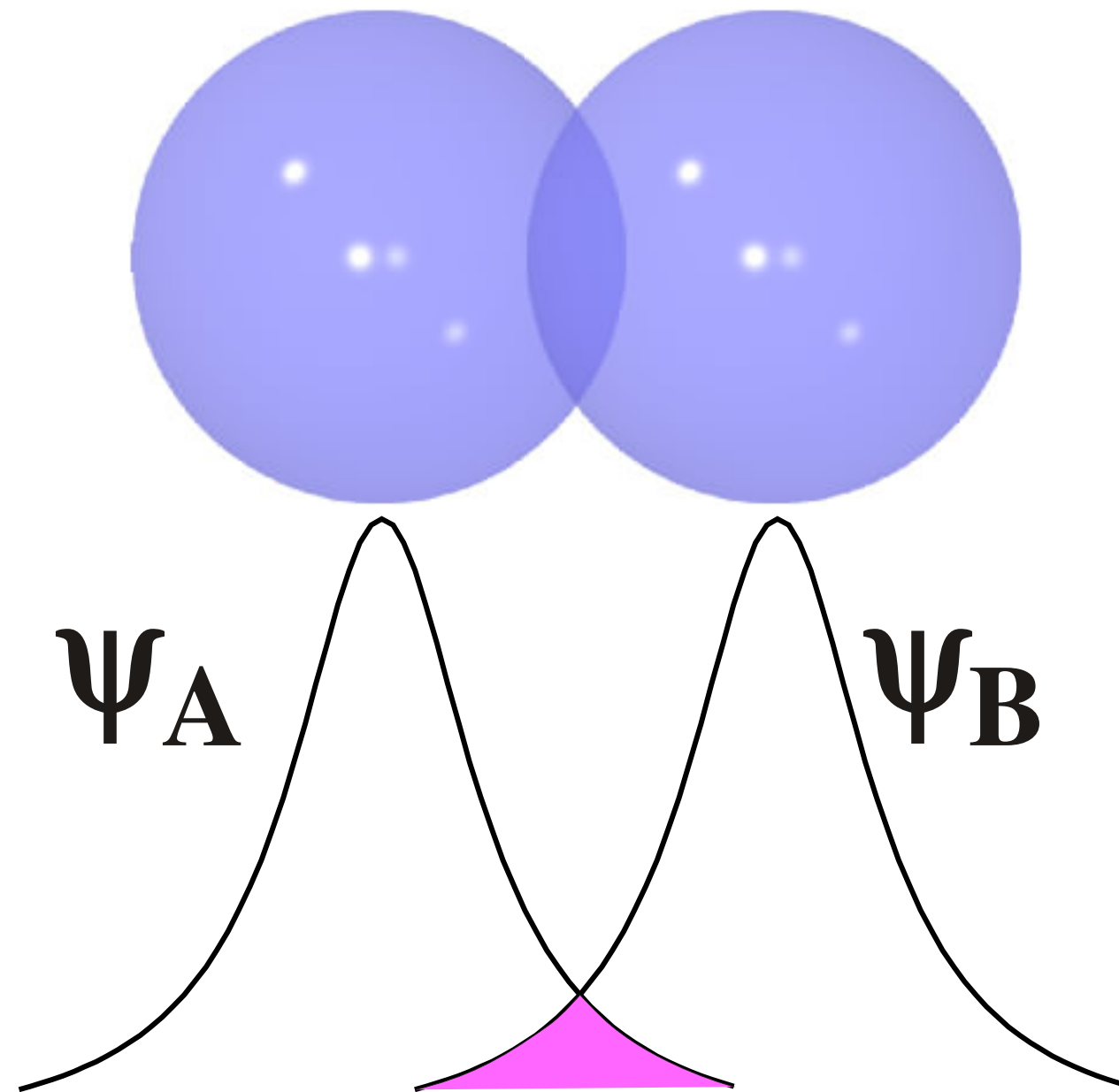
im Festkörper

Angegeben ist die Energie pro Atom, die benötigt wird, um aus einem Festkörper bei 0 K und 1 atm freie, neutrale Atome in ihrem Grundzustand zu bilden. Die Daten wurden von Prof. Leo Brewer in der Einheit kcal pro mol angegeben, nach dem LBL-Report 3720 vom 4. Mai 1977.

← kJ/mol →
← eV/atom →
← kcal/mol →

Li 158. 1.63 37.7	Be 320. 3.32 76.5											B 561 5.81 134	C 711. 7.37 170.	N 474. 4.92 113.4	O 251. 2.60 60.03	F 81.0 0.84 19.37	Ne 1.92 0.020 0.46																												
Na 107. 1.113 25.67	Mg 145. 1.51 34.7											Al 327. 3.39 78.1	Si 446. 4.63 106.7	P 331. 3.43 79.16	S 275. 2.85 65.75	Cl 135. 1.40 32.2	Ar 7.74 0.080 1.85																												
K 90.1 0.934 21.54	Ca 178. 1.84 42.5	Sc 376 3.90 89.9	Ti 468. 4.85 111.8	V 512. 5.31 122.4	Cr 395 4.10 94.5	Mn 282. 2.92 67.4	Fe 413 4.28 98.7	Co 424. 4.39 101.3	Ni 428. 4.44 102.4	Cu 336. 3.49 80.4	Zn 130 1.35 31.04	Ga 271 2.81 64.8	Ge 372 3.85 88.8	As 285.3 2.96 68.2	Se 237 2.48 56.7	Br 118. 1.22 28.18	Kr 11.2 0.116 2.68																												
Rb 82.2 0.852 19.64	Sr 166. 1.72 39.7	Y 422. 4.37 100.8	Zr 603. 6.25 144.2	Nb 730 7.57 174.5	Mo 658 6.82 157.2	Tc 661. 6.85 158.	Ru 650. 6.74 155.4	Rh 554. 5.75 132.5	Pd 376. 3.89 89.8	Ag 284. 2.95 68.0	Cd 112. 1.16 26.73	In 243. 2.52 58.1	Sn 303 3.14 72.4	Sb 265. 2.75 63.4	Te 211 2.19 50.34	I 107. 1.11 25.62	Xe 15.9 0.16 3.80																												
Cs 77.6 0.804 18.54	Ba 183. 1.90 43.7	La 431. 4.47 103.1	Hf 621. 6.44 148.4	Ta 782. 8.10 186.9	W 859. 8.90 205.2	Re 775. 8.03 185.2	Os 788 8.17 188.4	Ir 670. 6.94 160.1	Pt 564. 5.84 134.7	Au 368. 3.81 87.96	Hg 65 0.67 15.5	Tl 182. 1.88 43.4	Pb 196. 2.03 46.78	Bi 210. 2.18 50.2	Po 144. 1.50 34.5	At	Rn 19.5 0.202 4.66																												
Fr	Ra 160 1.66 38.2	Ac 410. 4.25 98	<table border="1"> <tbody> <tr> <td>Ce 417 4.32 99.7</td> <td>Pr 357 3.70 85.3</td> <td>Nd 328. 3.40 78.5</td> <td>Pm</td> <td>Sm 206. 2.14 49.3</td> <td>Eu 179. 1.86 42.8</td> <td>Gd 400. 4.14 95.5</td> <td>Tb 391. 4.05 93.4</td> <td>Dy 294. 3.04 70.2</td> <td>Ho 302. 3.14 72.3</td> <td>Er 317. 3.29 75.8</td> <td>Tm 233 2.42 55.8</td> <td>Yb 154. 1.60 37.1</td> <td>Lu 428. 4.43 102.2</td> </tr> <tr> <td>Th 598. 6.20 142.9</td> <td>Pa</td> <td>U 536. 5.55 128</td> <td>Np 456 4.73 109.</td> <td>Pu 347. 3.60 83.0</td> <td>Am 264. 2.73 63.</td> <td>Cm 385 3.99 92.1</td> <td>Bk</td> <td>Cf</td> <td>Es</td> <td>Fm</td> <td>Md</td> <td>No</td> <td>Lr</td> </tr> </tbody> </table>															Ce 417 4.32 99.7	Pr 357 3.70 85.3	Nd 328. 3.40 78.5	Pm	Sm 206. 2.14 49.3	Eu 179. 1.86 42.8	Gd 400. 4.14 95.5	Tb 391. 4.05 93.4	Dy 294. 3.04 70.2	Ho 302. 3.14 72.3	Er 317. 3.29 75.8	Tm 233 2.42 55.8	Yb 154. 1.60 37.1	Lu 428. 4.43 102.2	Th 598. 6.20 142.9	Pa	U 536. 5.55 128	Np 456 4.73 109.	Pu 347. 3.60 83.0	Am 264. 2.73 63.	Cm 385 3.99 92.1	Bk	Cf	Es	Fm	Md	No	Lr
Ce 417 4.32 99.7	Pr 357 3.70 85.3	Nd 328. 3.40 78.5	Pm	Sm 206. 2.14 49.3	Eu 179. 1.86 42.8	Gd 400. 4.14 95.5	Tb 391. 4.05 93.4	Dy 294. 3.04 70.2	Ho 302. 3.14 72.3	Er 317. 3.29 75.8	Tm 233 2.42 55.8	Yb 154. 1.60 37.1	Lu 428. 4.43 102.2																																
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Überlappintegral



$$S = \langle \Psi_A | \Psi_B \rangle$$

Das H₂ Molekül

