



A hand-drawn diagram on the left shows a series of overlapping elliptical shapes representing atomic orbitals, labeled with their quantum numbers: 1s, 2s, 2p, 3s, 3p, 3d, 4s, 4p, 4d, 4f, 5s, 5p, 5d, 5f, 6s, 6p, 6d, and 7s. To the right, a table lists the corresponding number of electrons (n) in each shell:

1s	2
2s 2p	8
3s 3p 3d	18
4s 4p 4d 4f	32
5s 5p 5d 5f	32
6s 6p 6d	18
7s	2

Below the table, the total number of electrons is given as $\Sigma 112 e^-$, followed by the question "sp Cn ?".

Auffüllen der Orbitale

"Pauli-Prinzip" (Aufbau-Prinzip)

Orbitale werden gefüllt, wobei sich e^- in mind. einer Quantenzahl unterscheiden müssen!

z.B. $2e^-$

$$\begin{aligned}\varphi_1 &= \phi_{1s} \alpha \\ \varphi_2 &= \phi_{1s} \beta\end{aligned}$$

beide e^- in demselben Orbital?

$$\Psi = \frac{1}{\sqrt{2}} \begin{vmatrix} \varphi_1(1) \varphi_1(2) \\ \varphi_1(2) \varphi_1(1) \end{vmatrix} = \frac{1}{\sqrt{2}} [\varphi_1(1)\varphi_1(2) - \varphi_1(1)\varphi_1(2)] = 0$$

Elektronenkonfig:

z.B. B: $1s^2 2s^2 2p^1$
[He] $2s^2 2p^1$

z.B. Sc: $[\text{Ar}] 3d^3$
 $[\text{Ar}] 3d^2 4s^1$?
 $[\text{Ar}] 3d^1 4s^2$

$$r_{\max}(4s) > r_{\max}(3d)$$