

## 2. Wasserstoff (H)

### 2.1. Element

|                          |                      | H <sub>2</sub> O | D <sub>2</sub> O | T <sub>2</sub> O |
|--------------------------|----------------------|------------------|------------------|------------------|
| Dichte bei 25°C          | [gcm <sup>-3</sup> ] | 0.99701          | 1.1044           | 1.2138           |
| Temp. des Dichtemaximums | [°C]                 | 4.0              | 11.2             | 13.4             |
| Schmelzpunkt             | [°C]                 | 0                | 3.81             | 4.48             |
| Siedepunkt               | [°C]                 | 100              | 101.42           | 101.51           |
| pk-Wert bei 25 °C        |                      | 14.0             | 14.869           | 15.215           |

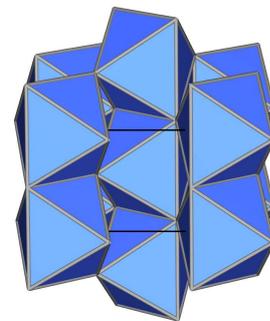
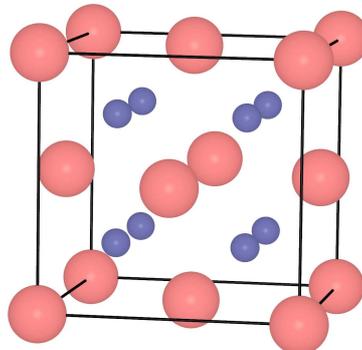
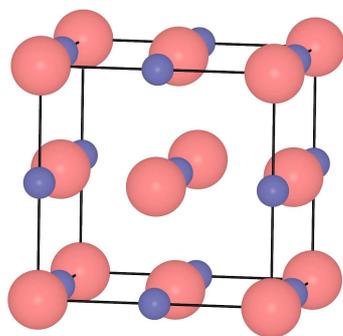
physikalische Konstanten von leichtem, schwerem und superschwerem H<sub>2</sub>O

### 2.2. Verbindungen (Übersicht)

|                  |                  |                  |                  |                  |                  |    |          |    |                  | <table border="1"> <tr><td>B</td><td>C</td><td>N</td><td>O</td><td>F</td><td>Ne</td></tr> <tr><td>BH<sub>3</sub></td><td>CH<sub>4</sub></td><td>NH<sub>3</sub></td><td>H<sub>2</sub>O</td><td>HF</td><td></td></tr> <tr><td>Al</td><td>Si</td><td>P</td><td>S</td><td>Cl</td><td>Ar</td></tr> <tr><td>AlH<sub>3</sub></td><td>SiH<sub>4</sub></td><td>PH<sub>3</sub></td><td>H<sub>2</sub>S</td><td>HCl</td><td></td></tr> </table> |                     |                     |                  |                  | B                   | C     | N  | O | F | Ne | BH <sub>3</sub> | CH <sub>4</sub> | NH <sub>3</sub> | H <sub>2</sub> O | HF |  | Al | Si | P | S | Cl | Ar | AlH <sub>3</sub> | SiH <sub>4</sub> | PH <sub>3</sub> | H <sub>2</sub> S | HCl |  |
|------------------|------------------|------------------|------------------|------------------|------------------|----|----------|----|------------------|---|---------------------|---------------------|------------------|------------------|---------------------|-------|----|---|---|----|-----------------|-----------------|-----------------|------------------|----|--|----|----|---|---|----|----|------------------|------------------|-----------------|------------------|-----|--|
| B                | C                | N                | O                | F                | Ne               |    |          |    |                  |   |                     |                     |                  |                  |                     |       |    |   |   |    |                 |                 |                 |                  |    |  |    |    |   |   |    |    |                  |                  |                 |                  |     |  |
| BH <sub>3</sub>  | CH <sub>4</sub>  | NH <sub>3</sub>  | H <sub>2</sub> O | HF               |                  |    |          |    |                  |   |                     |                     |                  |                  |                     |       |    |   |   |    |                 |                 |                 |                  |    |  |    |    |   |   |    |    |                  |                  |                 |                  |     |  |
| Al               | Si               | P                | S                | Cl               | Ar               |    |          |    |                  |   |                     |                     |                  |                  |                     |       |    |   |   |    |                 |                 |                 |                  |    |  |    |    |   |   |    |    |                  |                  |                 |                  |     |  |
| AlH <sub>3</sub> | SiH <sub>4</sub> | PH <sub>3</sub>  | H <sub>2</sub> S | HCl              |                  |    |          |    |                  |   |                     |                     |                  |                  |                     |       |    |   |   |    |                 |                 |                 |                  |    |  |    |    |   |   |    |    |                  |                  |                 |                  |     |  |
| H                |                  |                  |                  |                  |                  |    |          |    |                  |   |                     |                     |                  |                  | He                  |       |    |   |   |    |                 |                 |                 |                  |    |  |    |    |   |   |    |    |                  |                  |                 |                  |     |  |
| H <sub>2</sub>   |                  |                  |                  |                  |                  |    |          |    |                  |   |                     |                     |                  |                  |                     |       |    |   |   |    |                 |                 |                 |                  |    |  |    |    |   |   |    |    |                  |                  |                 |                  |     |  |
| Li               | Be               |                  |                  |                  |                  |    |          |    |                  |   |                     |                     |                  |                  |                     |       |    |   |   |    |                 |                 |                 |                  |    |  |    |    |   |   |    |    |                  |                  |                 |                  |     |  |
| LiH              | BeH <sub>2</sub> |                  |                  |                  |                  |    |          |    |                  |   |                     |                     |                  |                  |                     |       |    |   |   |    |                 |                 |                 |                  |    |  |    |    |   |   |    |    |                  |                  |                 |                  |     |  |
| Na               | Mg               |                  |                  |                  |                  |    |          |    |                  |   |                     |                     |                  |                  |                     |       |    |   |   |    |                 |                 |                 |                  |    |  |    |    |   |   |    |    |                  |                  |                 |                  |     |  |
| NaH              | MgH <sub>2</sub> |                  |                  |                  |                  |    |          |    |                  |   |                     |                     |                  |                  |                     |       |    |   |   |    |                 |                 |                 |                  |    |  |    |    |   |   |    |    |                  |                  |                 |                  |     |  |
| K                | Ca               | Sc               | Ti               | V                | Cr               | Mn | Fe       | Co | Ni               | Cu  | Zn                  | Ga                  | Ge               | As               | Se                  | Br    | Kr |   |   |    |                 |                 |                 |                  |    |  |    |    |   |   |    |    |                  |                  |                 |                  |     |  |
| KH               | CaH <sub>2</sub> | ScH <sub>x</sub> | TiH <sub>x</sub> | VH <sub>x</sub>  | CrH <sub>x</sub> |    | Hydrier- |    | NiH <sub>x</sub> | CuH   | ZnH <sub>2</sub>    | GaH <sub>3</sub>    | GeH <sub>4</sub> | AsH <sub>3</sub> | H <sub>2</sub> Se   | HBr   |    |   |   |    |                 |                 |                 |                  |    |  |    |    |   |   |    |    |                  |                  |                 |                  |     |  |
|                  |                  | x < 2            | x < 2            | x < 1            | x < 1            |    |          |    | x < 1            |   |                     |                     |                  |                  |                     |       |    |   |   |    |                 |                 |                 |                  |    |  |    |    |   |   |    |    |                  |                  |                 |                  |     |  |
| Rb               | Sr               | Y                | Zr               | Nb               | Mo               | Tc | Ru       | Rh | Pd               | Ag  | Cd                  | In                  | Sn               | Sb               | Te                  | I     | Xe |   |   |    |                 |                 |                 |                  |    |  |    |    |   |   |    |    |                  |                  |                 |                  |     |  |
| RbH              | SrH <sub>2</sub> | YH <sub>x</sub>  | ZrH <sub>x</sub> | NbH <sub>x</sub> |                  |    | kataly-  |    | PdH <sub>x</sub> | (AgH)   | CdH <sub>2</sub>    | (InH <sub>3</sub> ) | SnH <sub>4</sub> | SbH <sub>3</sub> | H <sub>2</sub> Te   | HI    |    |   |   |    |                 |                 |                 |                  |    |  |    |    |   |   |    |    |                  |                  |                 |                  |     |  |
|                  |                  | x < 2            | x < 2            | x < 1            |                  |    |          |    | x < 2            |   |                     |                     |                  |                  |                     |       |    |   |   |    |                 |                 |                 |                  |    |  |    |    |   |   |    |    |                  |                  |                 |                  |     |  |
| Cs               | Ba               | La               | Hf               | Ta               | W                | Re | Os       | Ir | Pt               | Au  | Hg                  | Tl                  | Pb               | Bi               | Po                  | At    | Xn |   |   |    |                 |                 |                 |                  |    |  |    |    |   |   |    |    |                  |                  |                 |                  |     |  |
| CsH              | BaH <sub>2</sub> | LaH <sub>x</sub> | HfH <sub>x</sub> | TaH <sub>x</sub> |                  |    | satoren  |    |                  | (AuH)   | (HgH <sub>2</sub> ) | (TlH <sub>3</sub> ) | PbH <sub>4</sub> | BiH <sub>3</sub> | (H <sub>2</sub> Po) | (HAt) |    |   |   |    |                 |                 |                 |                  |    |  |    |    |   |   |    |    |                  |                  |                 |                  |     |  |
|                  |                  | x < 2            | x < 2            | x < 1            |                  |    |          |    |                  |   |                     |                     |                  |                  |                     |       |    |   |   |    |                 |                 |                 |                  |    |  |    |    |   |   |    |    |                  |                  |                 |                  |     |  |

Übersicht über die Wasserstoffverbindungen der Elemente

Alkalimetall-Hydride: NaCl-Struktur  
 Erdalkalimetall-Hydride: HT-Phasen: Fluorid-Struktur (CaF<sub>2</sub>)  
 MgH<sub>2</sub>: Rutil-Struktur



Strukturen der ionischen und metallischen Hydride (↪ Metalle)

kovalente Hydride s. bei den jeweiligen Elementen (↪ Nichtmetalle)