

# Atommodelle

## **Leukipp, Demokrit (5. Jhd. v. Chr.)**

Materie: kleinste nicht teilbare Teilchen

## **Dalton (Anfang 19. Jhd.)**

Chemisches Element: gleiche unteilbare Atome

# Atommodelle

## Thomson (Mitte 19. Jhd.)

Atome: positiv geladene Materiekugeln mit eingebetteten Elektronen

## Rutherford (1911)

Atom (d  $10^{-10}$  m): Atomkern (d  $10^{-14}$  m), Atomhülle

# Atommodelle

## **Bohr (1913)**

Elektronenbahnen: Quantelung von Bahndrehimpuls und Energie

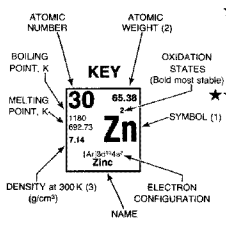
## **Heisenberg, Schrödinger, Pauli (ab 1925)**

Elektronenorbitale, Periodensystem der Elemente

# PERIODIC TABLE OF THE ELEMENTS

Table of Selected Radioactive Isotopes

GROUP IA		GROUP IIA		GROUP IIIA - VIIIA										GROUP VIII			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1 1.0079 <b>H</b> Hydrogen	2 4.0026 <b>He</b> Helium	3 6.941 <b>Li</b> Lithium	4 9.01218 <b>Be</b> Beryllium	5 10.81 <b>B</b> Boron	6 12.01 <b>C</b> Carbon	7 14.0067 <b>N</b> Nitrogen	8 15.9994 <b>O</b> Oxygen	9 18.998403 <b>F</b> Fluorine	10 20.179 <b>Ne</b> Neon	11 22.98977 <b>Na</b> Sodium	12 24.305 <b>Mg</b> Magnesium	13 26.98154 <b>Al</b> Aluminum	14 28.0855 <b>Si</b> Silicon	15 30.97376 <b>P</b> Phosphorus	16 32.06 <b>S</b> Sulfur	17 35.453 <b>Cl</b> Chlorine	18 39.948 <b>Ar</b> Argon
19 39.0983 <b>K</b> Potassium	20 40.08 <b>Ca</b> Calcium	21 44.9559 <b>Sc</b> Scandium	22 47.90 <b>Ti</b> Titanium	23 50.9415 <b>V</b> Vanadium	24 51.996 <b>Cr</b> Chromium	25 54.9380 <b>Mn</b> Manganese	26 55.847 <b>Fe</b> Iron	27 58.9332 <b>Co</b> Cobalt	28 58.70 <b>Ni</b> Nickel	29 63.546 <b>Cu</b> Copper	30 65.38 <b>Zn</b> Zinc	31 68.72 <b>Ga</b> Gallium	32 72.59 <b>Ge</b> Germanium	33 74.9216 <b>As</b> Arsenic	34 78.96 <b>Se</b> Selenium	35 79.904 <b>Br</b> Bromine	36 83.80 <b>Kr</b> Krypton
37 85.4678 <b>Rb</b> Rubidium	38 87.62 <b>Sr</b> Strontium	39 88.9059 <b>Y</b> Yttrium	40 91.22 <b>Zr</b> Zirconium	41 92.9064 <b>Nb</b> Niobium	42 95.94 <b>Mo</b> Molybdenum	43 98.906 <b>Tc</b> Technetium	44 101.07 <b>Ru</b> Ruthenium	45 101.07 <b>Rh</b> Rhodium	46 106.4 <b>Pd</b> Palladium	47 107.868 <b>Ag</b> Silver	48 112.41 <b>Cd</b> Cadmium	49 114.82 <b>In</b> Indium	50 118.69 <b>Sn</b> Tin	51 121.75 <b>Sb</b> Antimony	52 127.60 <b>Te</b> Tellurium	53 126.9045 <b>I</b> Iodine	54 131.30 <b>Xe</b> Xenon
55 132.9054 <b>Cs</b> Cesium	56 137.33 <b>Ba</b> Barium	57 138.9055 <b>La</b> Lanthanum	72 178.49 <b>Hf</b> Hafnium	73 180.9479 <b>Ta</b> Tantalum	74 183.85 <b>W</b> Tungsten	75 186.207 <b>Re</b> Rhenium	76 186.207 <b>Os</b> Osmium	77 190.23 <b>Ir</b> Iridium	78 195.09 <b>Pt</b> Platinum	79 196.9665 <b>Au</b> Gold	80 200.59 <b>Hg</b> Mercury	81 204.37 <b>Tl</b> Thallium	82 207.2 <b>Pb</b> Lead	83 208.9804 <b>Bi</b> Bismuth	84 209 <b>Po</b> Polonium	85 210 <b>At</b> Astatine	86 222 <b>Rn</b> Radon
87 223 <b>Fr</b> Francium	88 226.0254 <b>Ra</b> Radium	89 227.0278 <b>Ac</b> Actinium	104 261 <b>Uuq</b> Ununquadium	105 262 <b>Uup</b> Ununpentium	106 263 <b>Uuh</b> Ununhexium	<p>† The names and symbols of elements 104-106 are those recommended by IUPAC as systematic alternatives to those suggested by the purported discoverers. Berkeley (USA) researchers have proposed Rutherfordium, 104, for element 104 and Dubnium, 105, for element 105. Dubna (USSR) researchers, who also claim the discovery of these elements have proposed different names (and symbols).</p> <p>The A &amp; B subgroup designations, applicable to elements in rows 4, 5, 6, and 7, are those recommended by the International Union of Pure and Applied Chemistry. It should be noted that some authors and organizations use the opposite convention in distinguishing these subgroups.</p>											



58 140.12 3.4 3.4 3.4 3.4 <b>Ce</b> Cerium	59 140.9077 3.4 3.4 3.4 3.4 <b>Pr</b> Praseodymium	60 144.24 3.4 3.4 3.4 3.4 <b>Nd</b> Neodymium	61 144.9126 3.4 3.4 3.4 3.4 <b>Pm</b> Promethium	62 150.4 3.4 3.4 3.4 3.4 <b>Sm</b> Samarium	63 151.96 3.4 3.4 3.4 3.4 <b>Eu</b> Europium	64 157.25 3.4 3.4 3.4 3.4 <b>Gd</b> Gadolinium	65 158.9254 3.4 3.4 3.4 3.4 <b>Tb</b> Terbium	66 162.50 3.4 3.4 3.4 3.4 <b>Dy</b> Dysprosium	67 164.9304 3.4 3.4 3.4 3.4 <b>Ho</b> Holmium	68 167.26 3.4 3.4 3.4 3.4 <b>Er</b> Erbium	69 168.9342 3.4 3.4 3.4 3.4 <b>Tm</b> Thulium	70 173.04 3.4 3.4 3.4 3.4 <b>Yb</b> Ytterbium	71 174.967 3.4 3.4 3.4 3.4 <b>Lu</b> Lutetium
90 232.0381 11.7 11.7 11.7 11.7 <b>Th</b> Thorium	91 231.0369 15.4 15.4 15.4 15.4 <b>Pa</b> Protactinium	92 238.0289 19.0 19.0 19.0 19.0 <b>U</b> Uranium	93 238.0289 19.0 19.0 19.0 19.0 <b>Np</b> Neptunium	94 238.0289 19.0 19.0 19.0 19.0 <b>Pu</b> Plutonium	95 244 19.8 19.8 19.8 19.8 <b>Am</b> Americium	96 247 19.8 19.8 19.8 19.8 <b>Cm</b> Curium	97 247 19.8 19.8 19.8 19.8 <b>Bk</b> Berkelium	98 251 19.8 19.8 19.8 19.8 <b>Cf</b> Californium	99 252 19.8 19.8 19.8 19.8 <b>Es</b> Einsteinium	100 257 19.8 19.8 19.8 19.8 <b>Fm</b> Fermium	101 258 19.8 19.8 19.8 19.8 <b>Md</b> Mendelevium	102 259 19.8 19.8 19.8 19.8 <b>No</b> Nobelium	103 260 19.8 19.8 19.8 19.8 <b>Lr</b> Lawrencium

NOTES:  
(1) Black — solid  
Red — gas  
Blue — liquid  
Outline — synthetically prepared.  
(2) Based upon carbon-12, (1) indicates most stable or best known isotope.  
(3) Entries marked with asterisks refer to the gaseous state at 273 K and 1 atm and are given in units of g/l.

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