Mendeleev's Predicted Elements

Mendeleev left gaps in his table and named the missing elements with Sanskrit prefixes: eka (one), dvi (two) and tri (three) steps below a known element.

Mendeleev's name	Modern element	Predicted atomic mass
Eka-boron	Scandium (Sc), atomic number 21	44–45
Eka-aluminium	Gallium (Ga), atomic number 31	68
Eka-silicon	Germanium (Ge), atomic number 32	72
Eka-manganese	Technetium (Tc), atomic number 43	100
Tri-manganese	Rhenium (Re), atomic number 75	–
Dvi-tellurium	Polonium (Po), atomic number 84	–
Dvi-caesium	Francium (Fr), atomic number 87	–
Eka-tantalum	Protactinium (Pa), atomic number 91	–

Eka-aluminium and gallium

Property	Predicted by Mendeleev	Observed
Atomic mass	68	69.7231
Density (g/cm³)	6.0	5.91
Melting point	Low	29.76 °C
Oxide formula	Ea_2O_3	Ga_2O_3
Oxide density (g/cm³)	5.5	5.88
Chloride formula	Ea_2Cl_6	Ga_2Cl_6
Chloride	Volatile	Volatile

Eka-silicon and germanium

Property	Predicted by Mendeleev	Observed
Atomic mass	72	72.6308
Density (g/cm³)	5.5	5.323
Melting point	High	938.25 °C
Color	Grey	Grey
Oxide density (g/cm³)	4.7	4.228
Oxide character	Feebly basic	Feebly basic
Chloride boiling point	Under 100 °C	86.5 °C ($GeCl_4$)
Chloride density (g/cm³)	1.9	1.879

Mendeleev's Predicted Elements PDF (Eka-Aluminium, Eka-Boron, Eka-Silicon): notes

About this sheet

The eight elements Mendeleev's table predicted, with their modern names and atomic numbers. Eka-aluminium (gallium) and eka-silicon (germanium) are compared property by property with the observed values.

Best for

Showing why the periodic law was convincing: predictions made before the elements were found, then checked.

Printing

Sized for A4 portrait: print at 100% (actual size). The header colors are light, so it also prints well in grayscale.

What the data shows

The sheet matches eight of Mendeleev's predicted elements to their modern names. Eka-aluminium became gallium (found in 1875), eka-boron became scandium (1879) and eka-silicon became germanium (1886).

That the predicted properties matched so closely is what convinced chemists to accept his table.

How the table is organised

Atomic number counts the protons in an atom's nucleus and fixes each element's place in the table. Moving down a group adds a new electron shell, so atomic radius grows and metallic character increases.

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