Radial Table of the Periodic System of D. I. Mendeleev

All 25 tables and models · Dr. Oleg Schipin

Short captions explaining what each table shows. The order follows the presentation and the description.

The radial table

1. Radial Table of the Periodic System of D. I. Mendeleev — main version (s, p, d, f)
2. Radial table without the f-rows
3. Trends in the radial table

The three-dimensional pyramid

4. Pyramid of the periodic system — front-right view
5. Property trends on the three-dimensional pyramid
6. Stepped pyramid
7. Pyramid on a pedestal with the lanthanides and actinides
8. Pyramid with an alley of lanthanides and actinides

Valence, oxides and pH

9. Valence by sector, higher oxides and hydrogen compounds

Groups and their names

10. Main groups with their group names
11. All elements with the names of the main groups and B subgroups

Metals, non-metals and acidity

12. Metals, non-metals and metalloids — main groups
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Yin and Yang, bonding and state of matter

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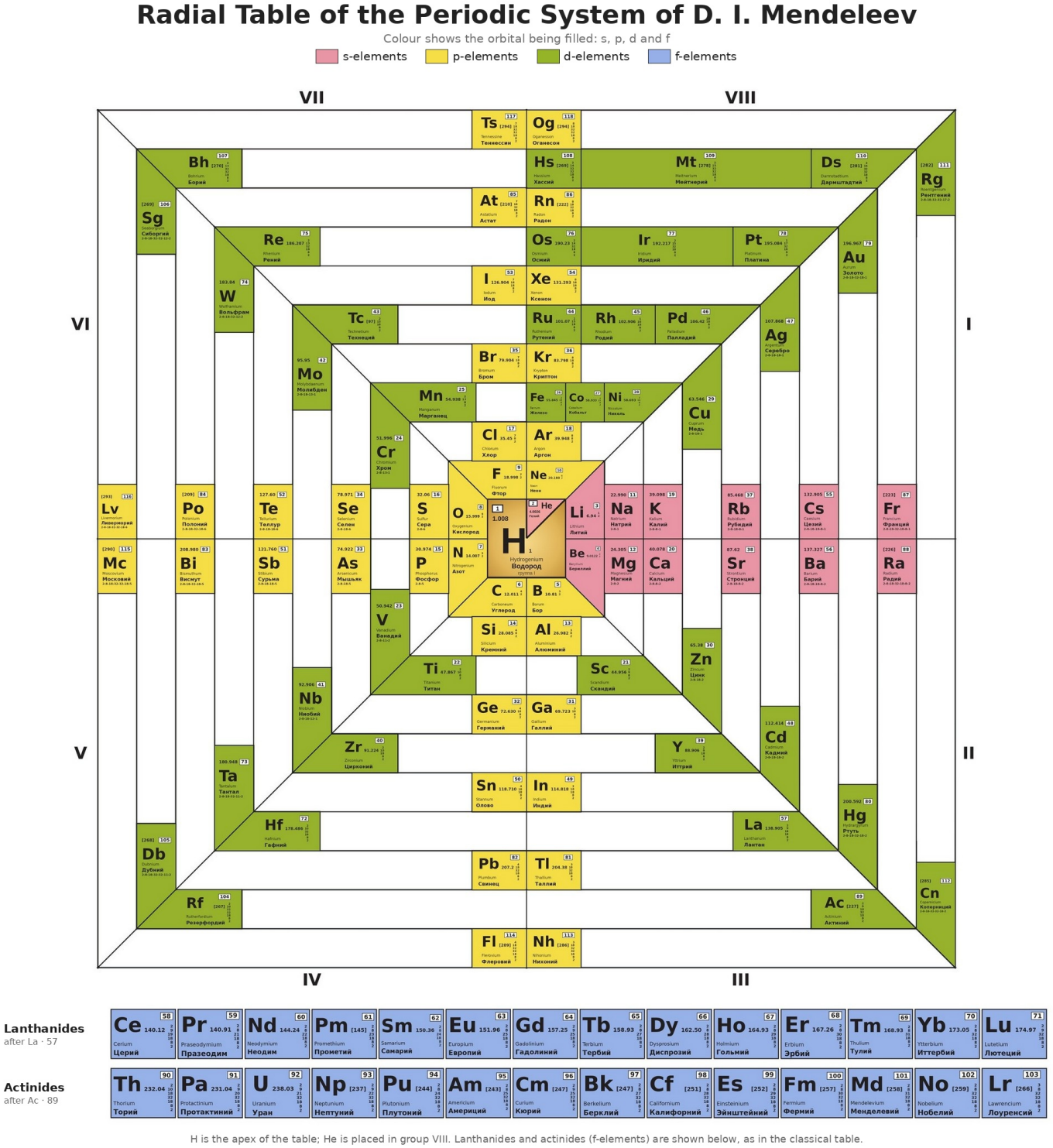
22. The five shu points of the five elements
23. Mandala of the main groups — light, square
24. Mandala of the main groups — dark, round
25. Mandala with the complete radial table

Table 1. Radial Table of the Periodic System of D. I. Mendeleev — main version (s, p, d, f)



H is the apex of the table; He is placed in group VIII. Lanthanides and actinides (f-elements) are shown below, as in the classical table.

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Table 2. Radial table without the f-rows

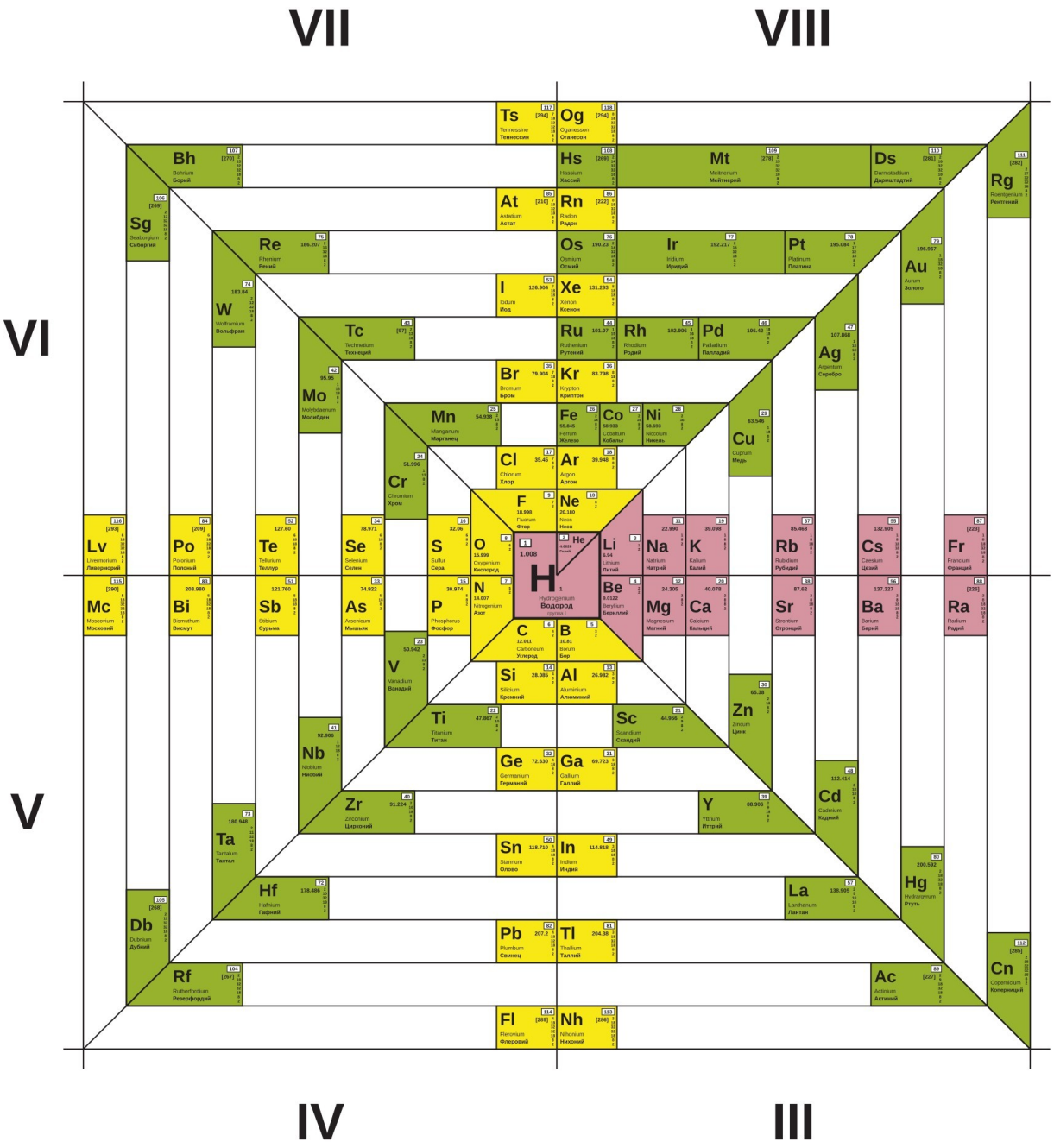


Table 3. Trends in the radial table

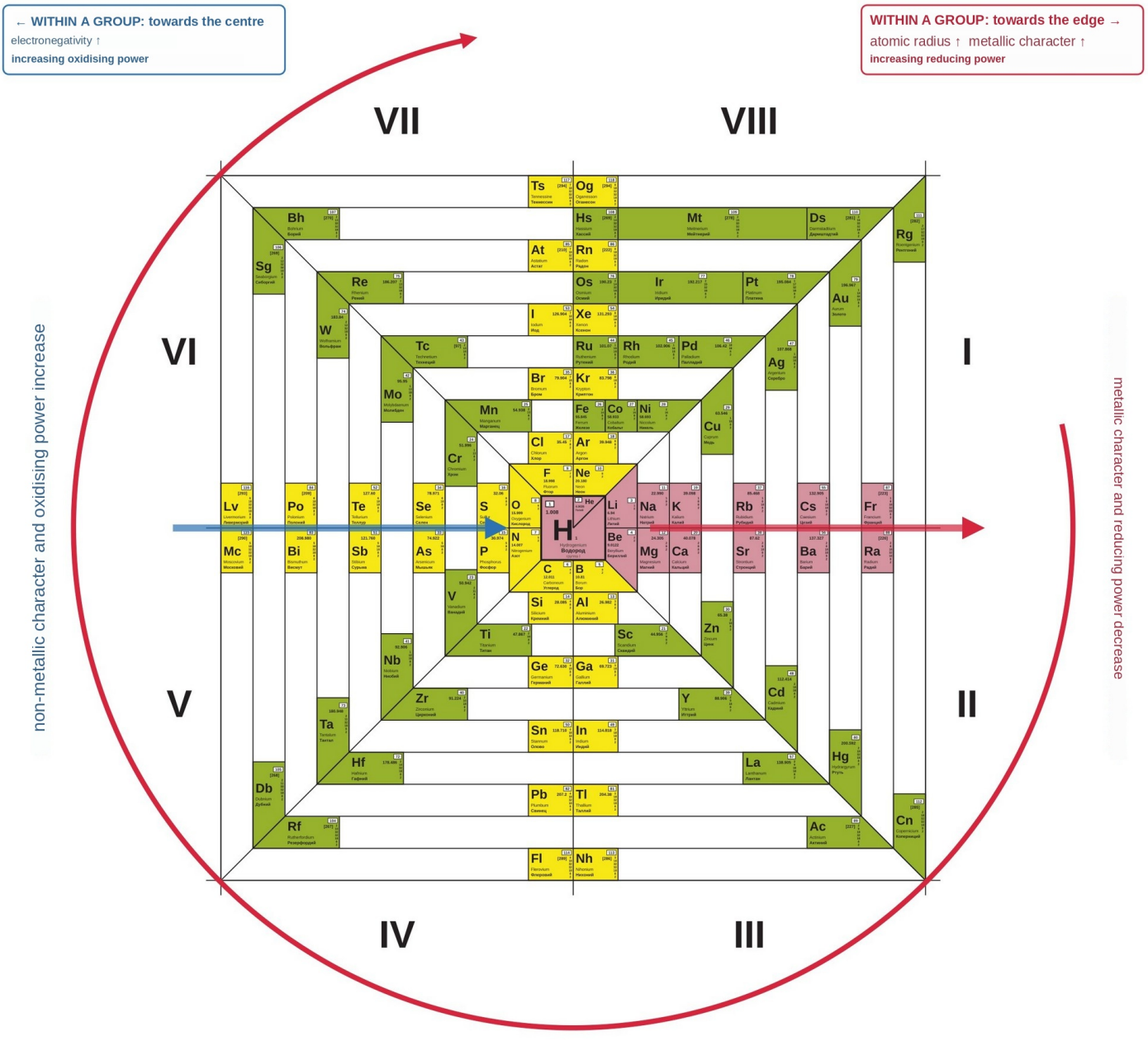


Table 4. Pyramid of the periodic system — front-right view

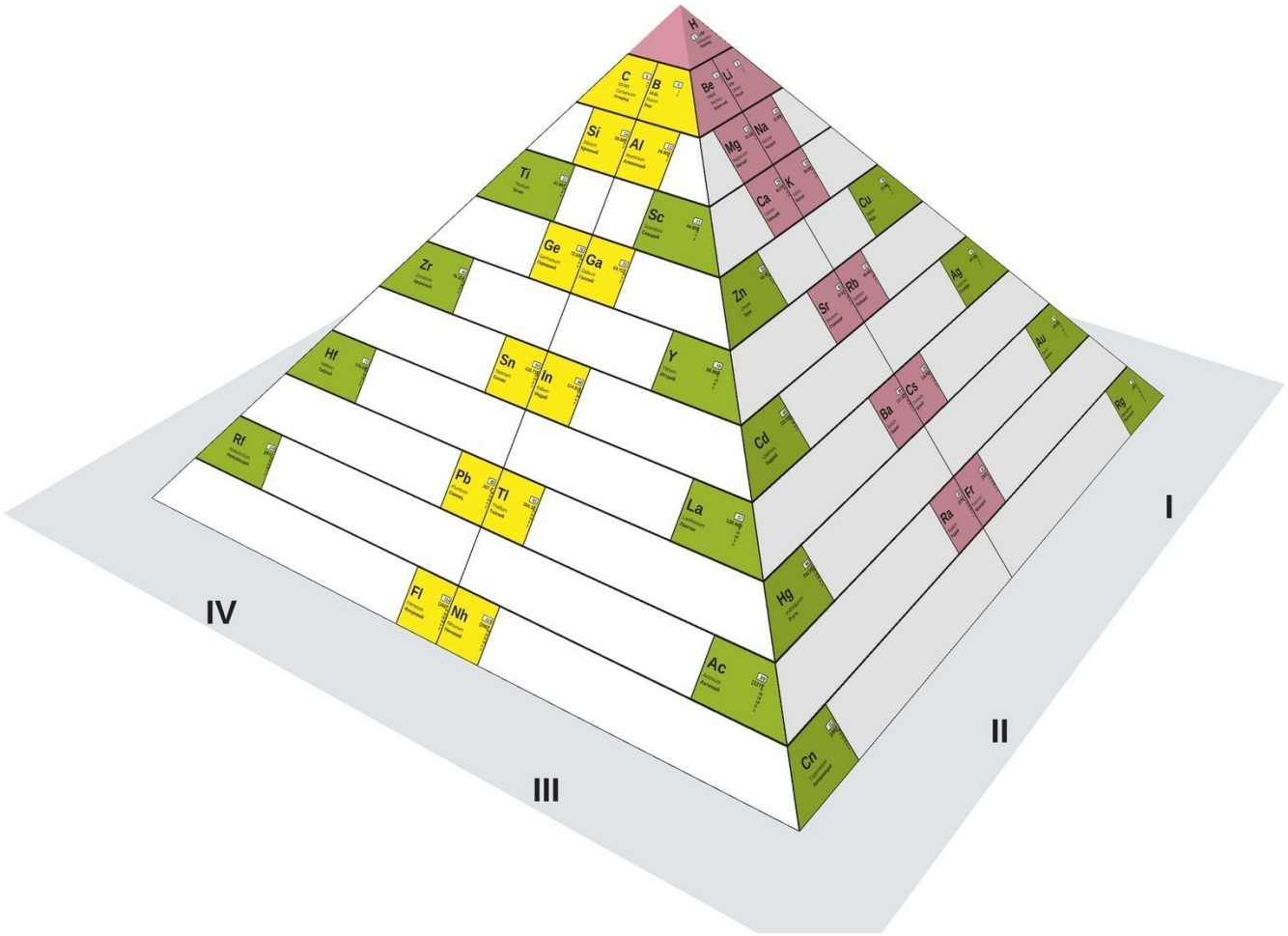


Table 5. Property trends on the three-dimensional pyramid

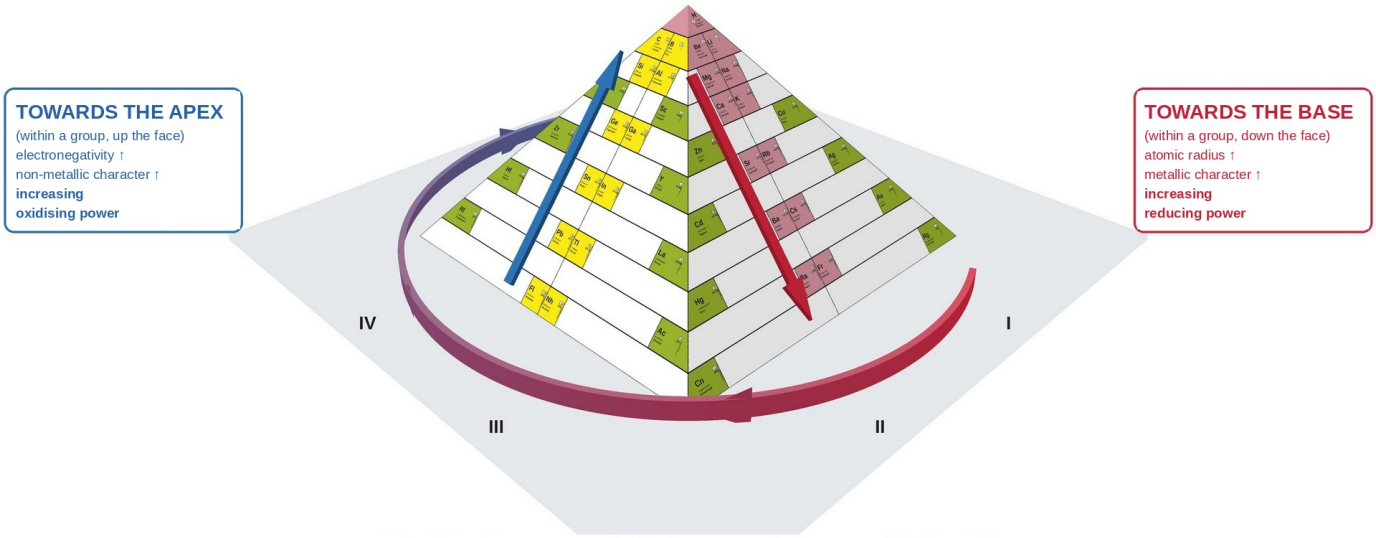


Table 6. Stepped pyramid

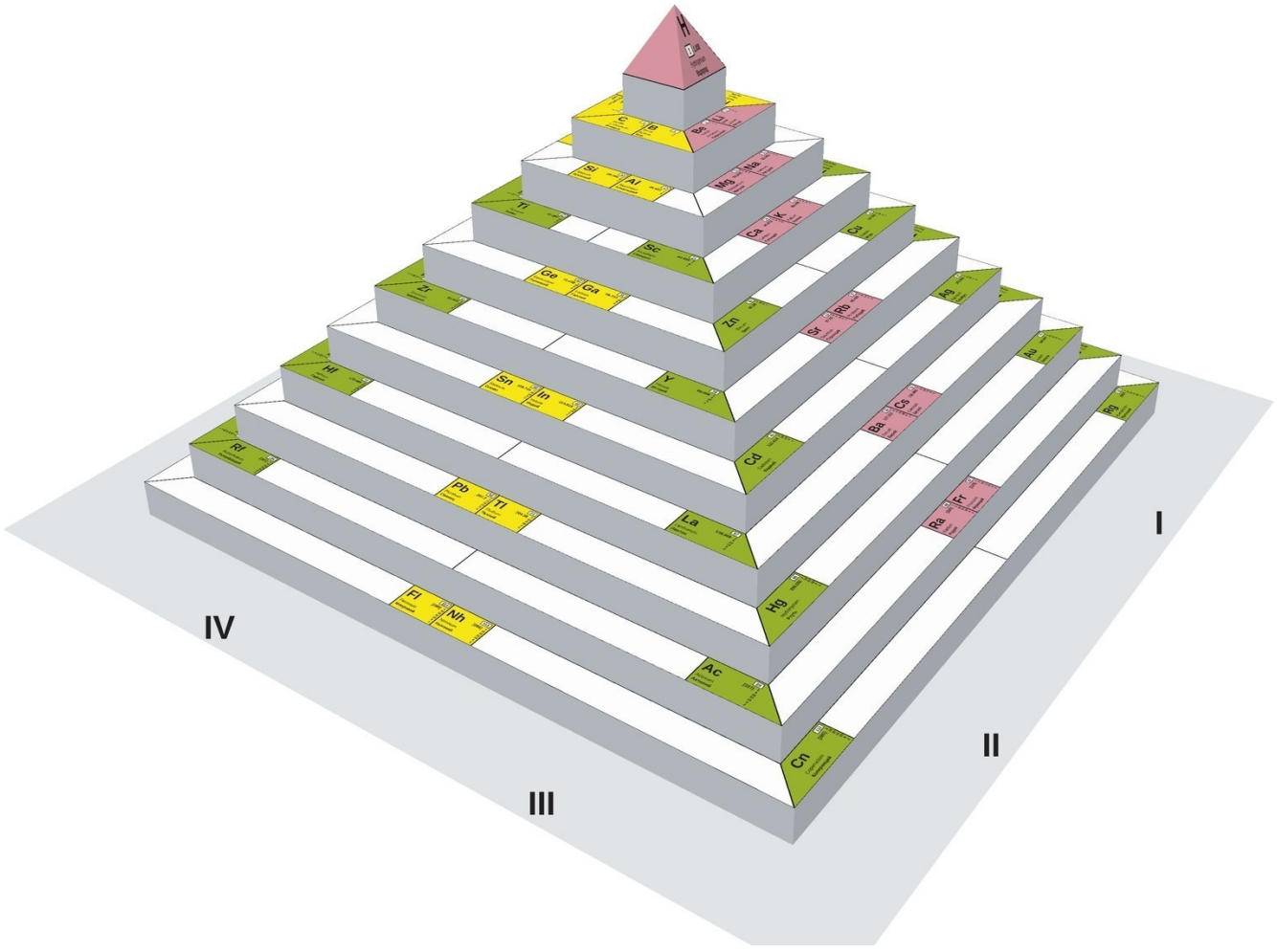


Table 7. Pyramid on a pedestal with the lanthanides and actinides

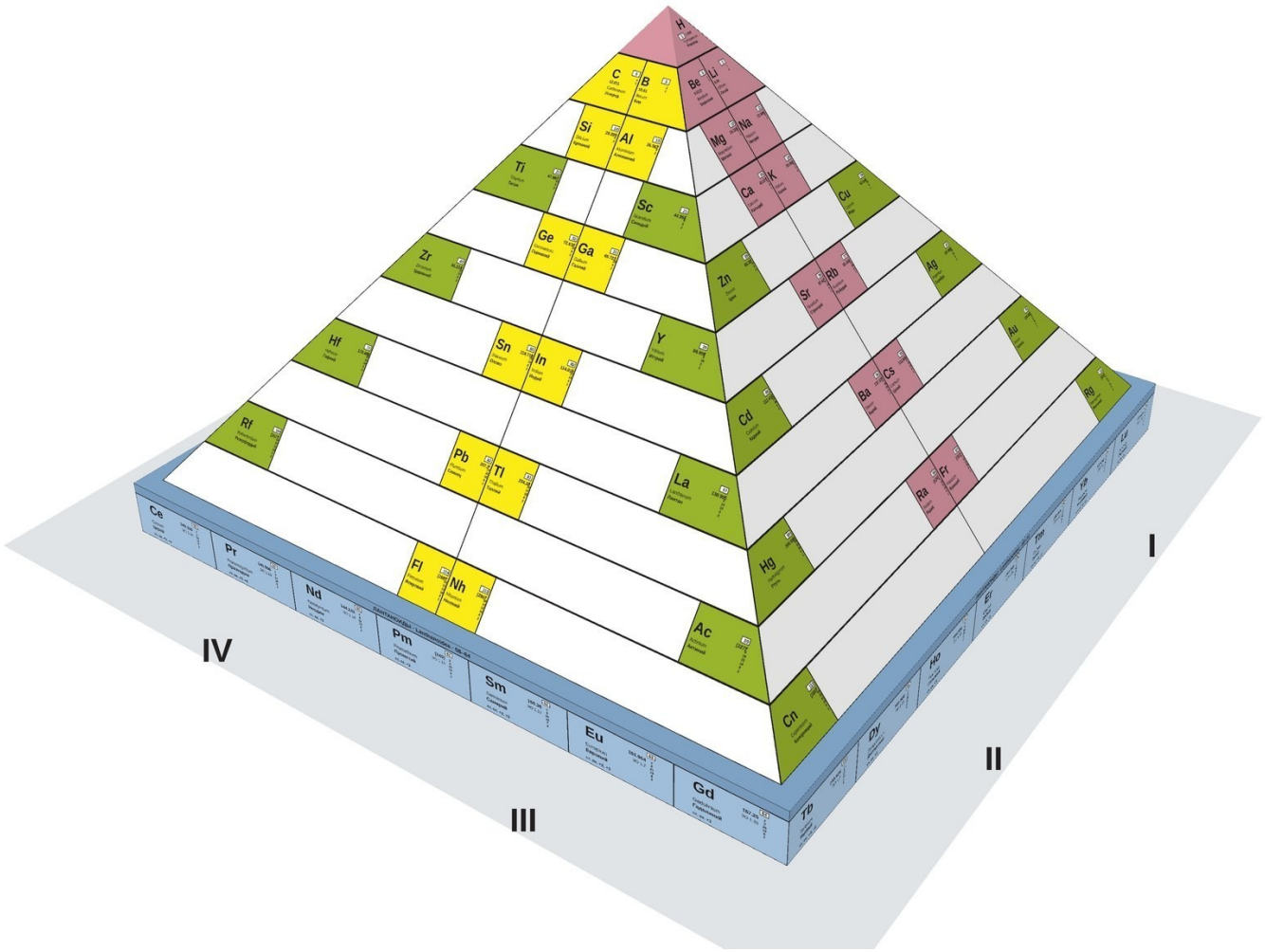


Table 8. Pyramid with an alley of lanthanides and actinides

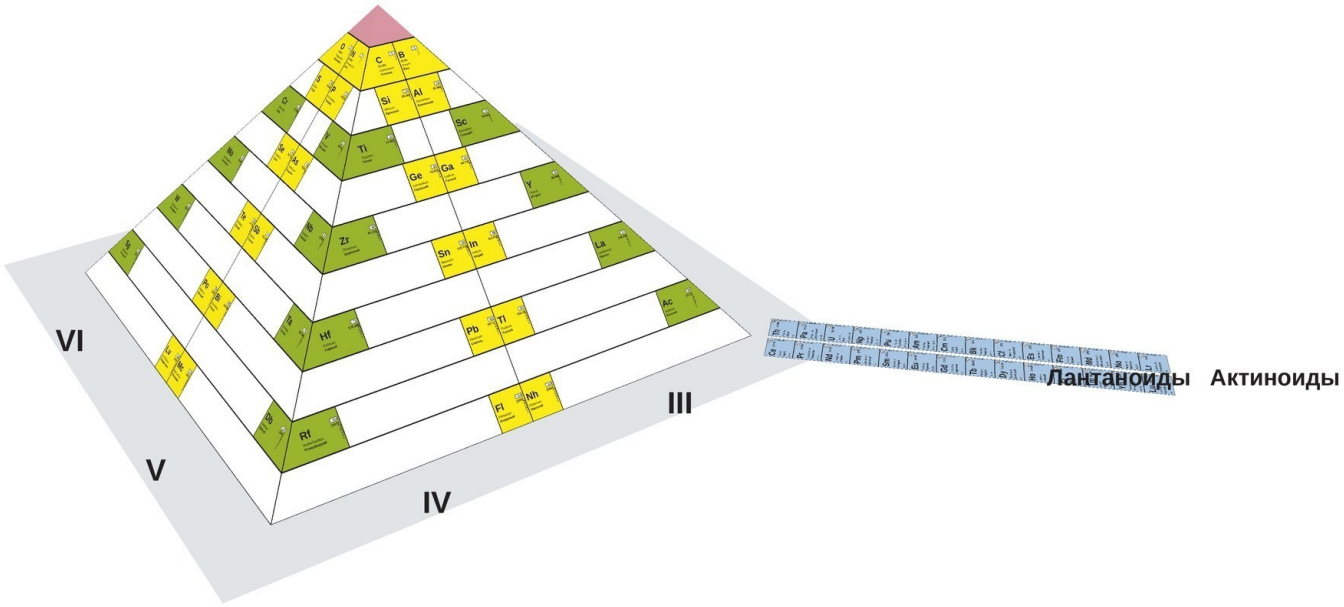
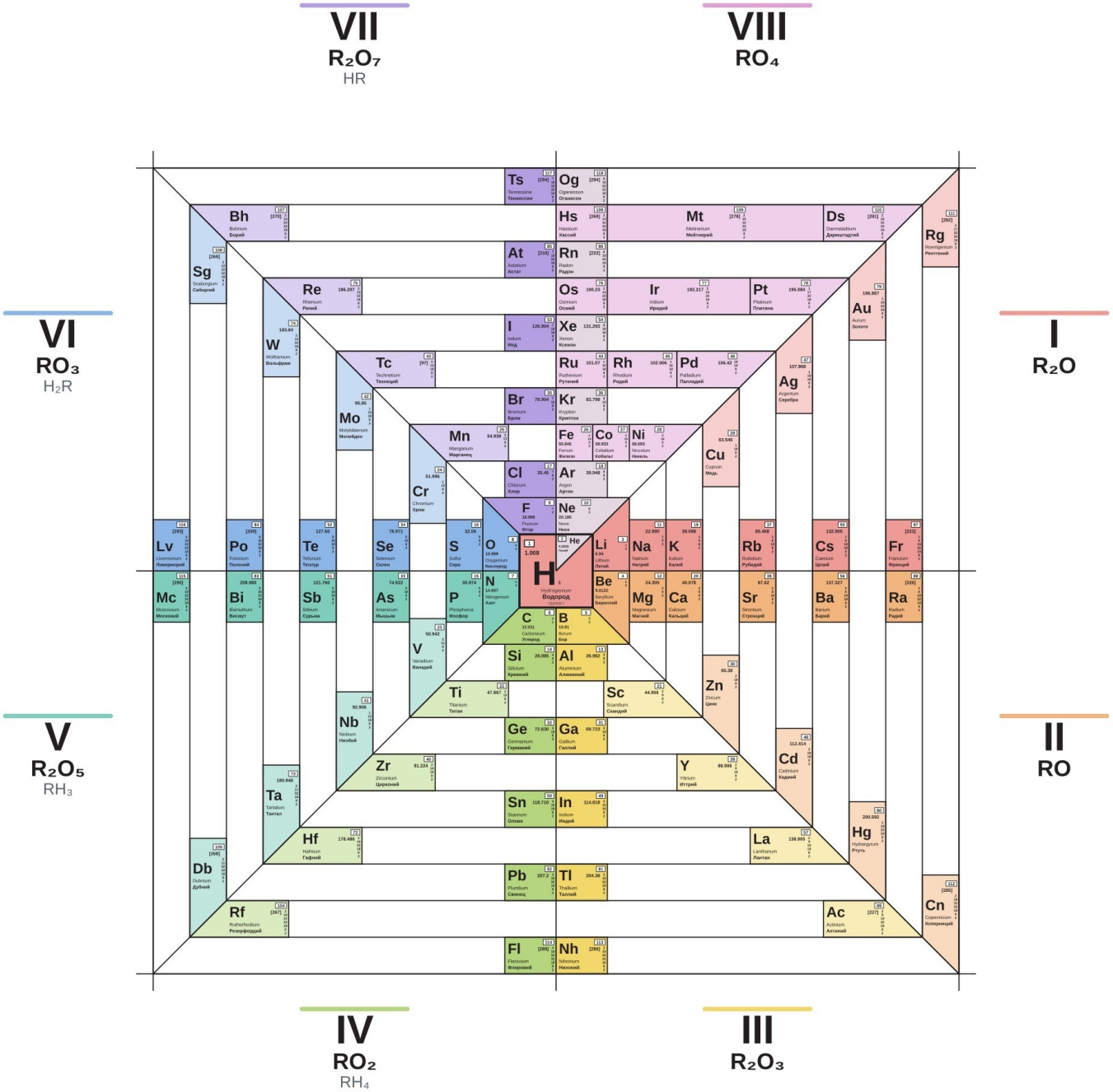


Table 9. Valence by sector, higher oxides and hydrogen compounds



Group	I	II	III	IV	V	VI	VII	VIII
Higher oxide	R_2O	RO	R_2O_3	RO_2	R_2O_5	RO_3	R_2O_7	RO_4
Volatile hydrogen compound	—	—	—	RH_4	RH_3	H_2R	HR	—

Cell colour = group, and therefore the highest valence towards oxygen (equal to the group number). Bright cells: main groups; pale cells: transition elements. Exceptions: fluorine (only I) and oxygen (usually II) do not form the higher oxides of their group; among the noble gases, oxides are known only for xenon (XeO_3, XeO_4); Cu, Ag, Au can also exceed I (CuO, $AuCl_3$); in group VIII only Ru, Os and Xe reach valence VIII (RuO_4, OsO_4, XeO_4).

Table 10. Main groups with their group names

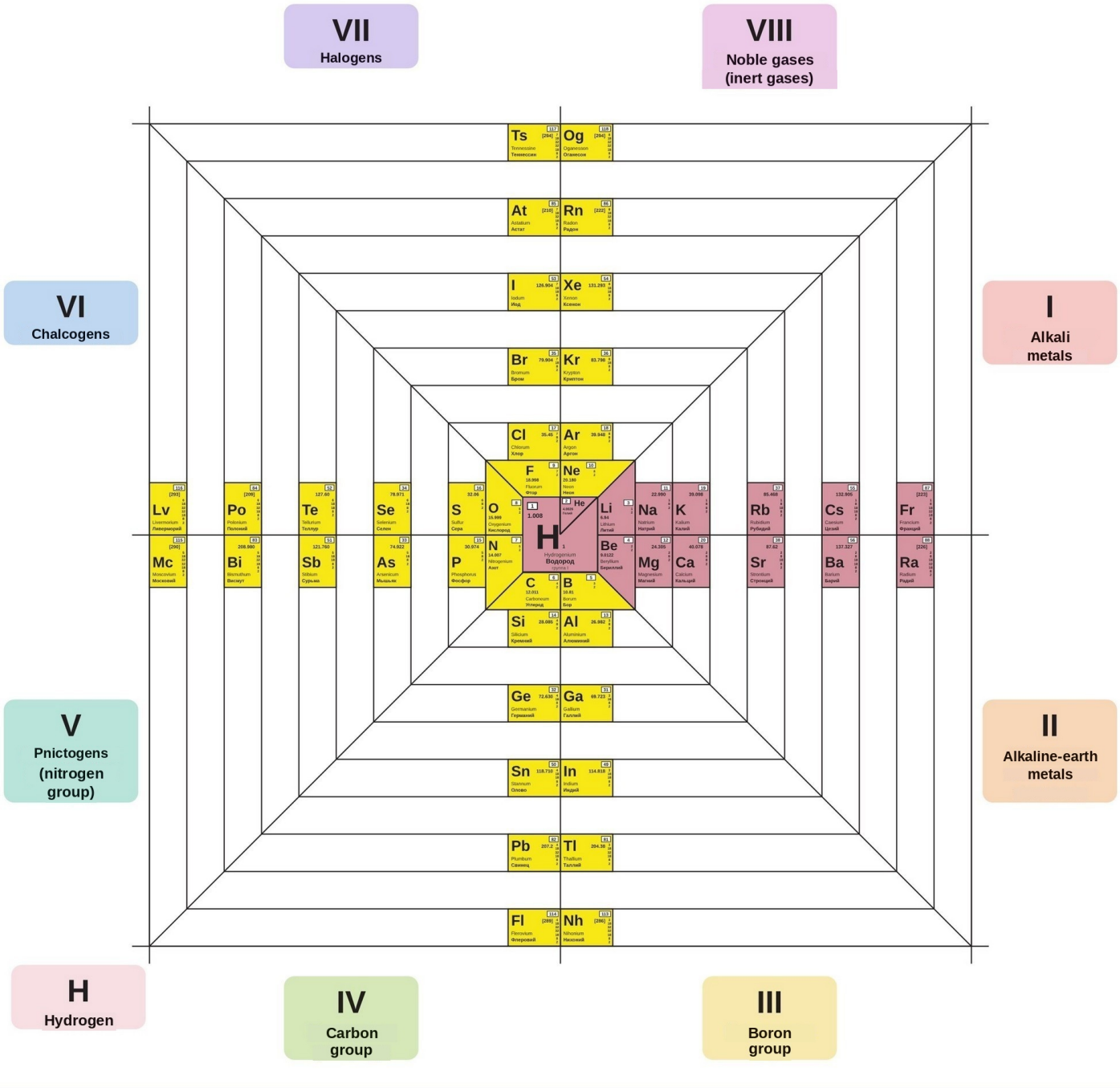


Table 11. All elements with the names of the main groups and B subgroups

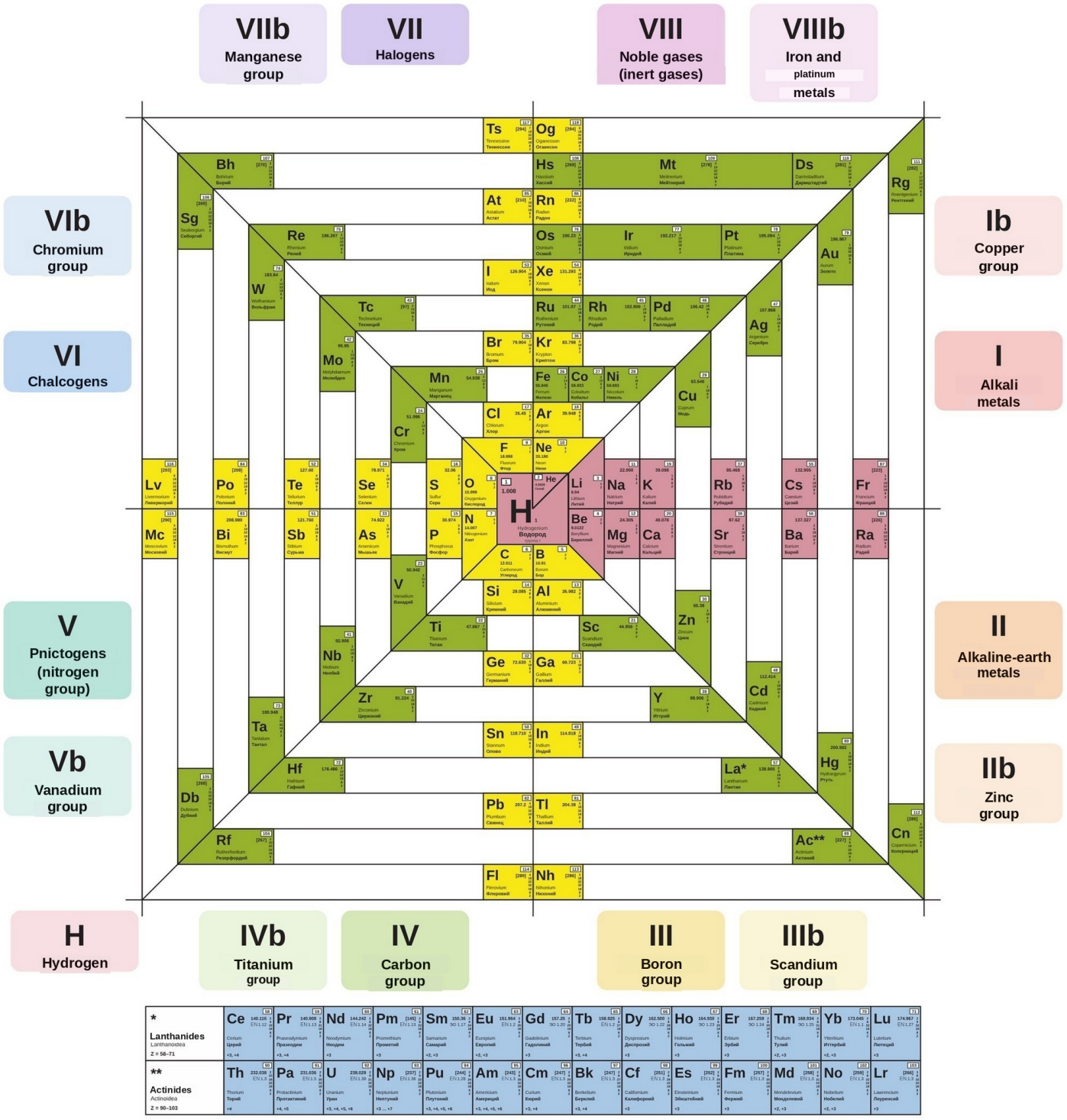
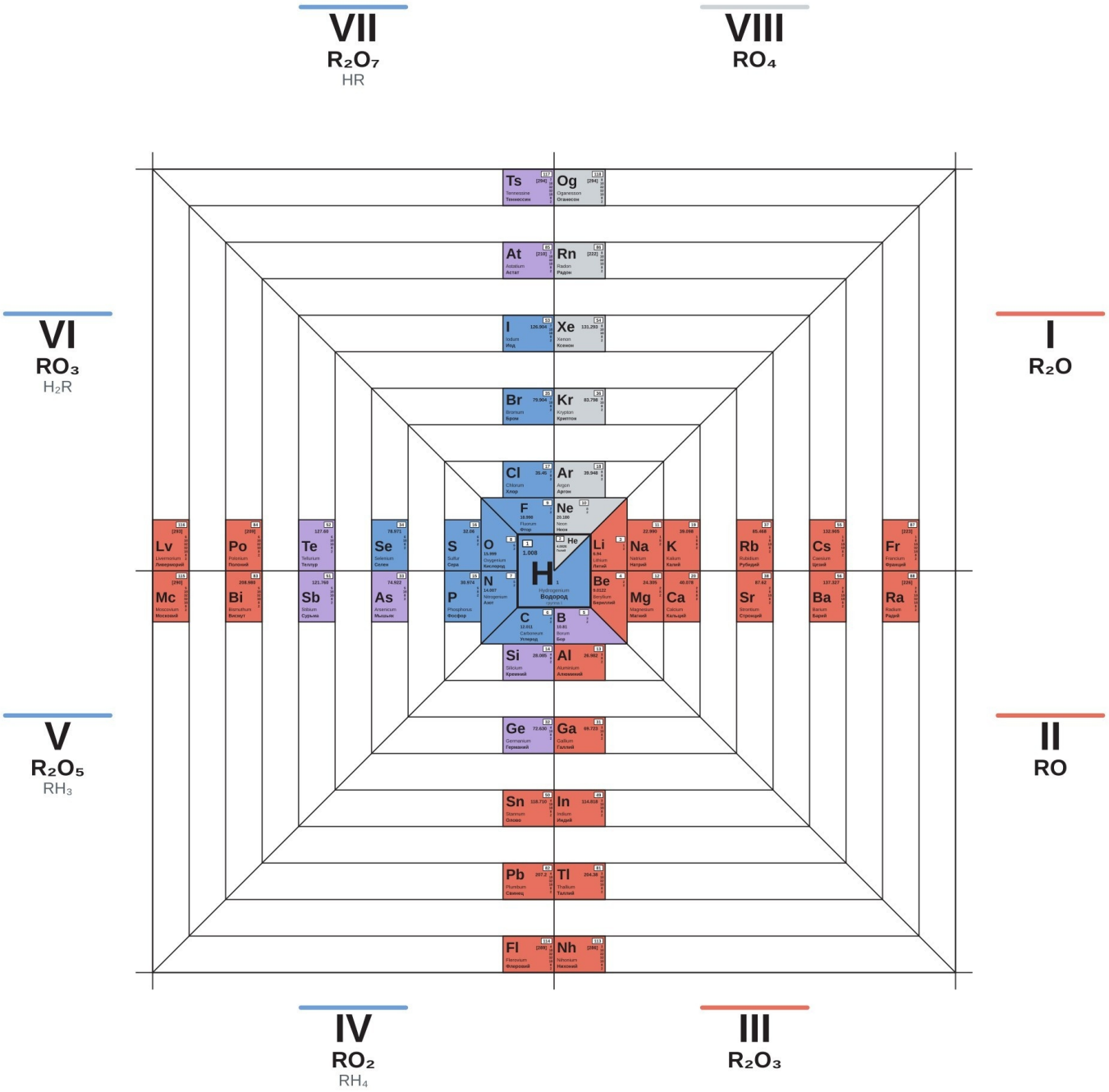


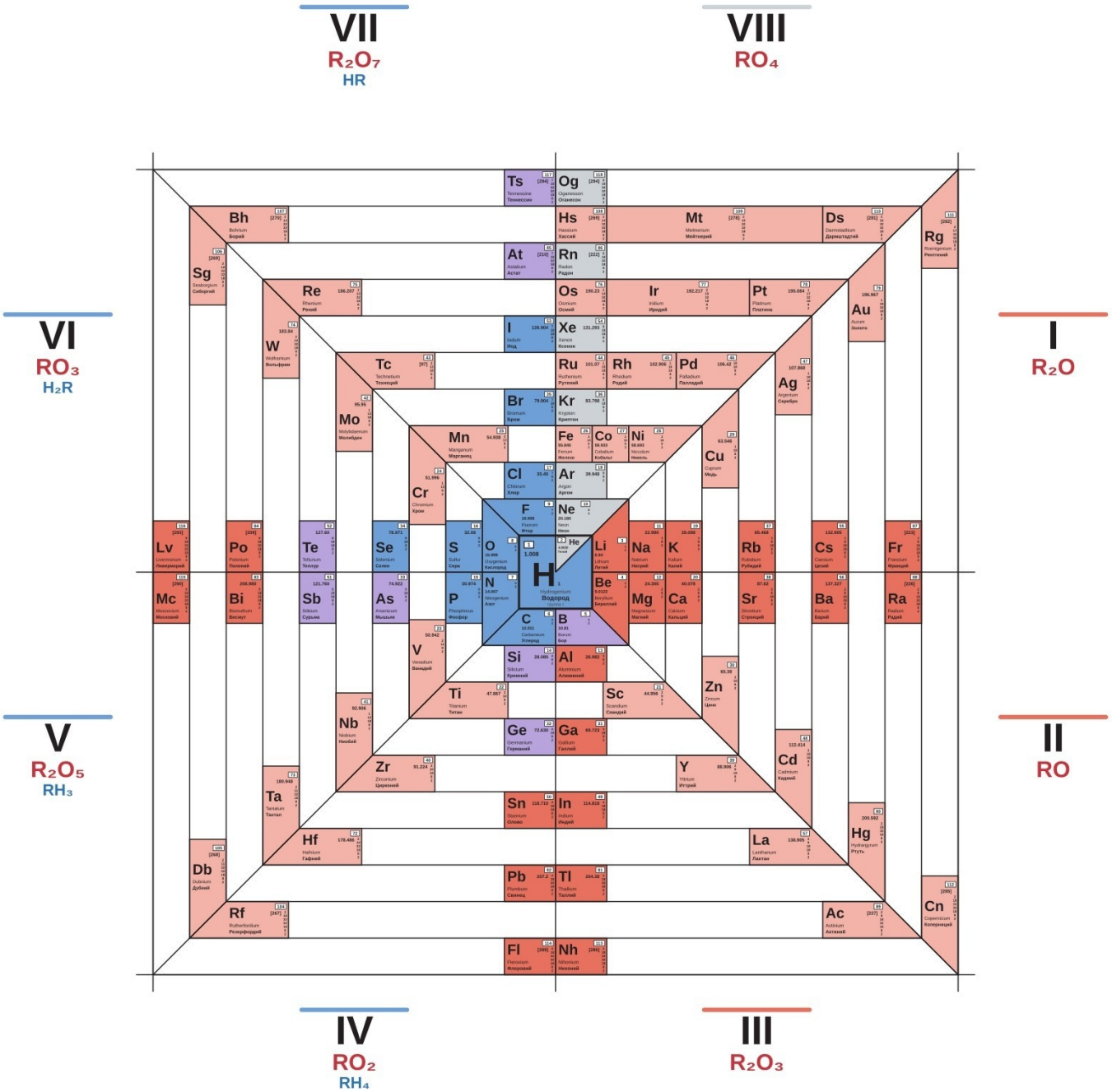
Table 12. Metals, non-metals and metalloids — main groups



Group	I	II	III	IV	V	VI	VII	VIII
Higher oxide	R_2O	RO	R_2O_3	RO_2	R_2O_5	RO_3	R_2O_7	RO_4
Volatile hydrogen compound	—	—	—	RH_4	RH_3	H_2R	HR	—

Red: metals, typical reducing agents; they give up electrons and form no volatile hydrogen compounds (the hydrides NaH, CaH_2 are solid and ionic).
Blue: non-metals that readily accept electrons; they form volatile hydrogen compounds RH_4, RH_3, H_2R, HR (CH_4, NH_3, H_2O, HF …).
Violet: metalloids on the border (B, Si, Ge, As, Sb, Te, At, Ts); grey: noble gases. Rule: valence towards O + valence towards H = 8.

Table 13. Metals and non-metals — all elements



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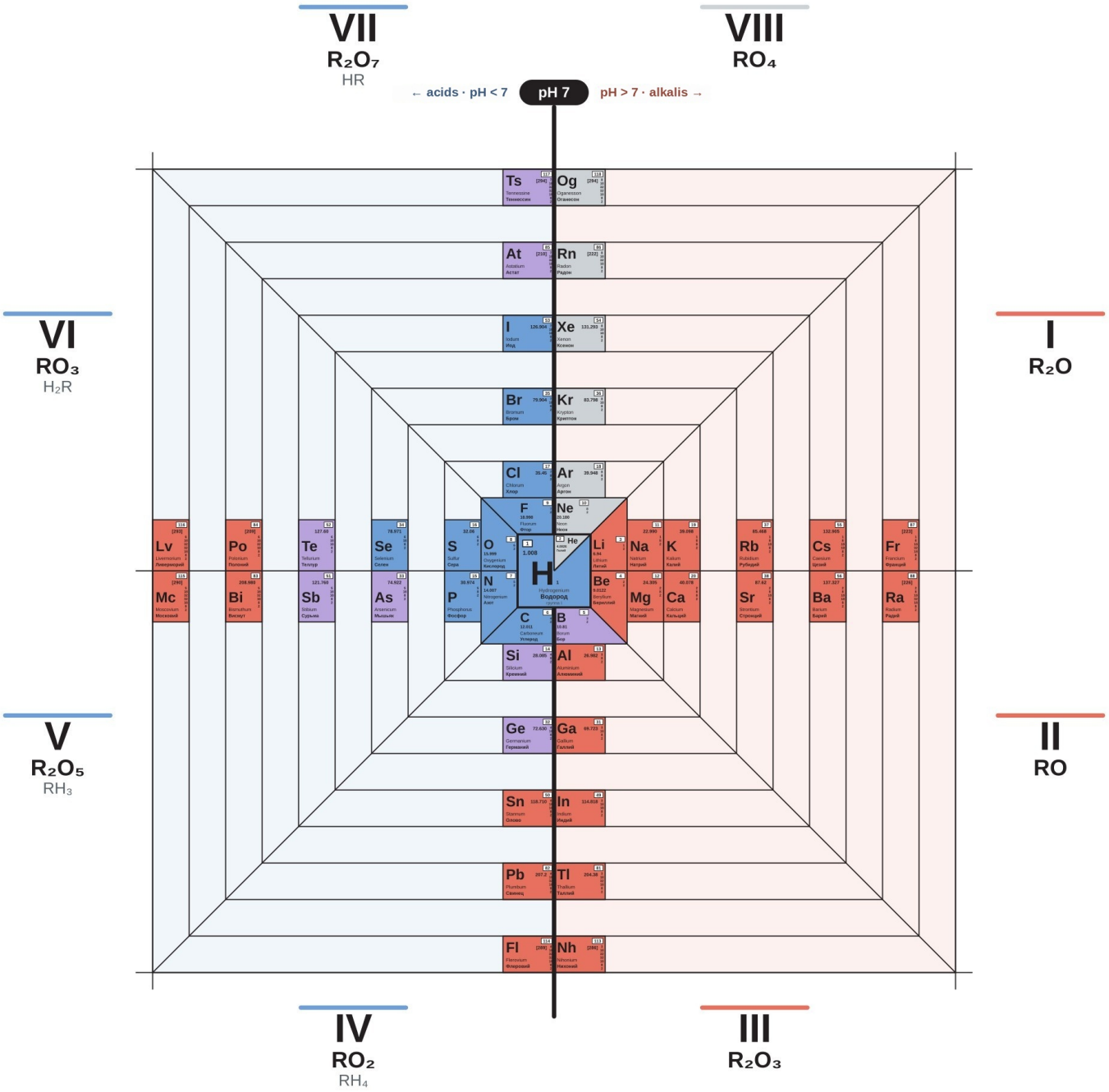
Violet: metalloids (B, Si, Ge, As, Sb, Te, At, Ts); grey: noble gases. Pale red: transition elements on the edges – all d-elements are metals.

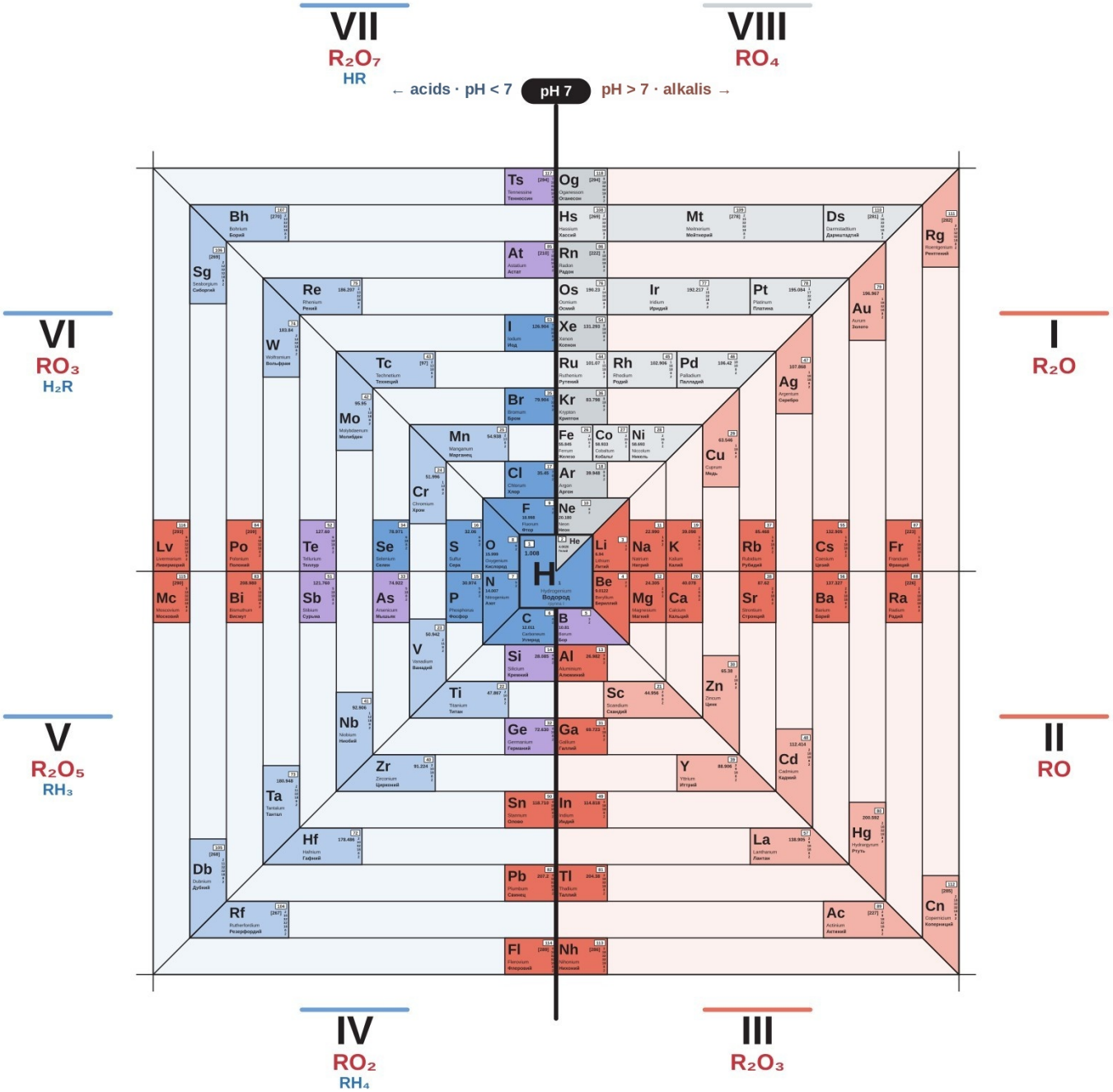
Table 14. The pH 7 line — main groups



Group	I	II	III	IV	V	VI	VII	VIII
Higher oxide	R_2O	RO	R_2O_3	RO_2	R_2O_5	RO_3	R_2O_7	RO_4
Volatile hydrogen compound	—	—	—	RH_4	RH_3	H_2R	HR	—

The pH 7 line runs along the vertical axis: on the left groups IV–VII (non-metals, acidic oxides, solution pH < 7), on the right groups I–III (metals, bases, pH > 7). Group VIII (noble gases) is neutral. Exceptions near the line: boron is on the right but forms boric acid; at the bottom left Sn, Pb, Bi, Po are metals with amphoteric and basic oxides. Acid strength increases towards fluorine and chlorine near the centre on the left, base strength towards caesium and francium at the right edge.

Table 15. The pH 7 line — all elements



Group	I	II	III	IV	V	VI	VII	VIII
Higher oxide	R_2O	RO	R_2O_3	RO_2	R_2O_5	RO_3	R_2O_7	RO_4
Volatile hydrogen compound	—	—	—	RH_4	RH_3	H_2R	HR	—

The pH 7 line runs along the vertical axis: on the left groups IV–VII (non-metals, acidic oxides, solution pH < 7), on the right groups I–III (metals, bases, pH > 7). Group VIII (noble gases) is neutral. Exceptions near the line: boron is on the right but forms boric acid; at the bottom left Sn, Pb, Bi, Po are metals with amphoteric and basic oxides. Transition elements (pale) are coloured by their higher oxide: Mn_2O_7, CrO_3 – acidic (left); CuO, ZnO, Sc_2O_3 – basic/amphoteric (right); VIII – grey.

Table 16. Higher oxides and hydrogen compounds

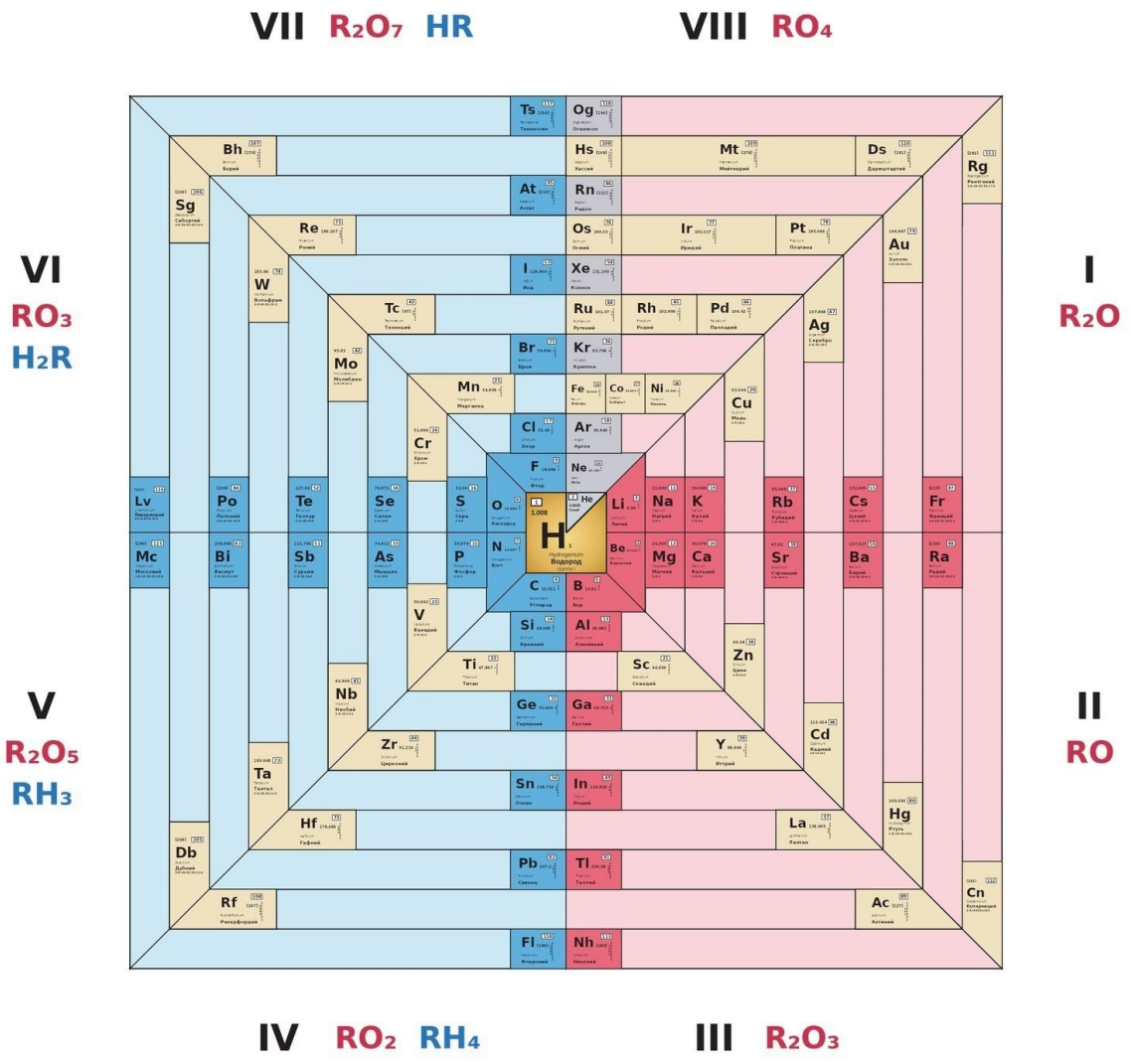


Table 17. Yin and Yang, the pH = 7 line

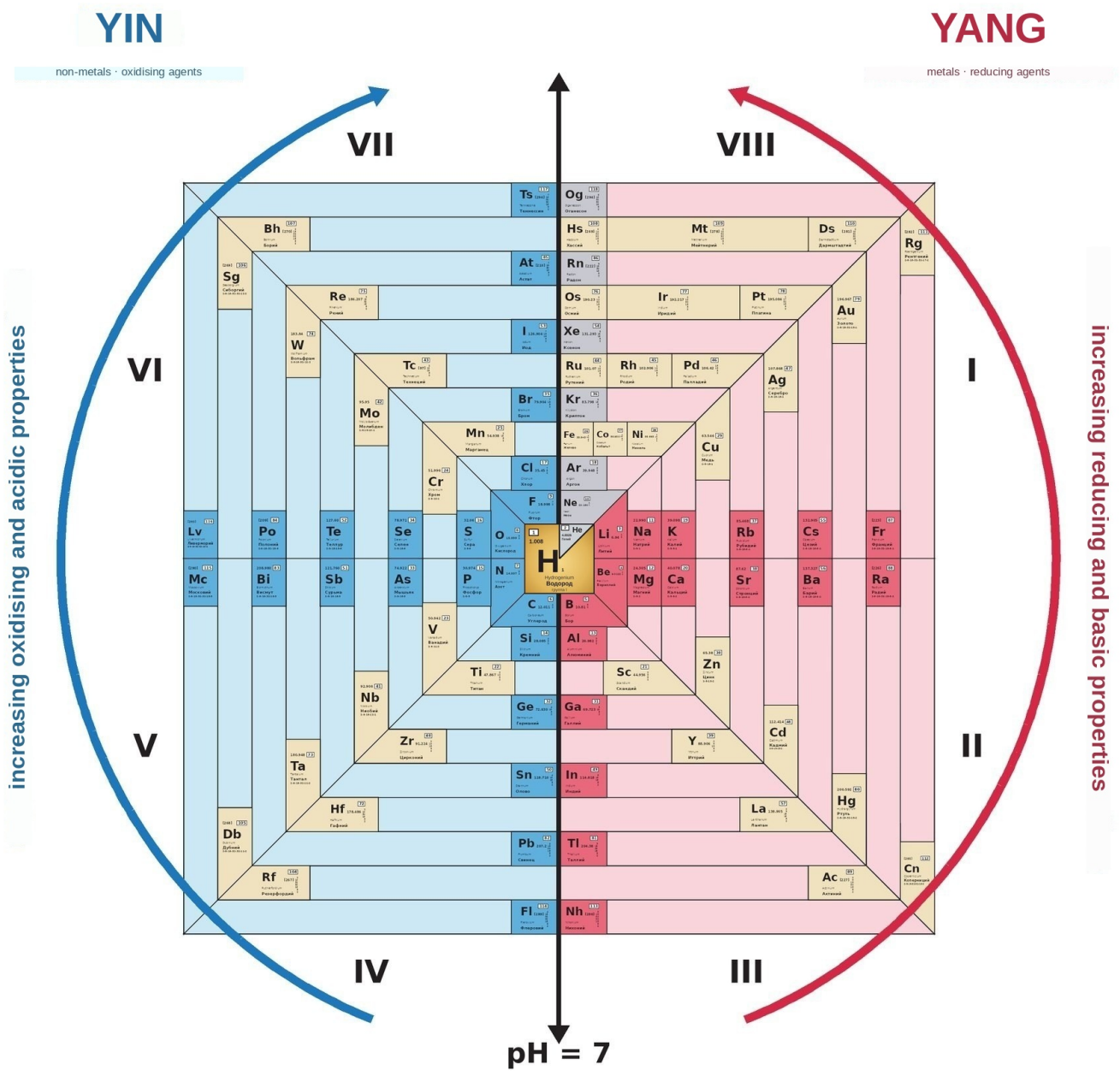


Table 18. Types of chemical bond

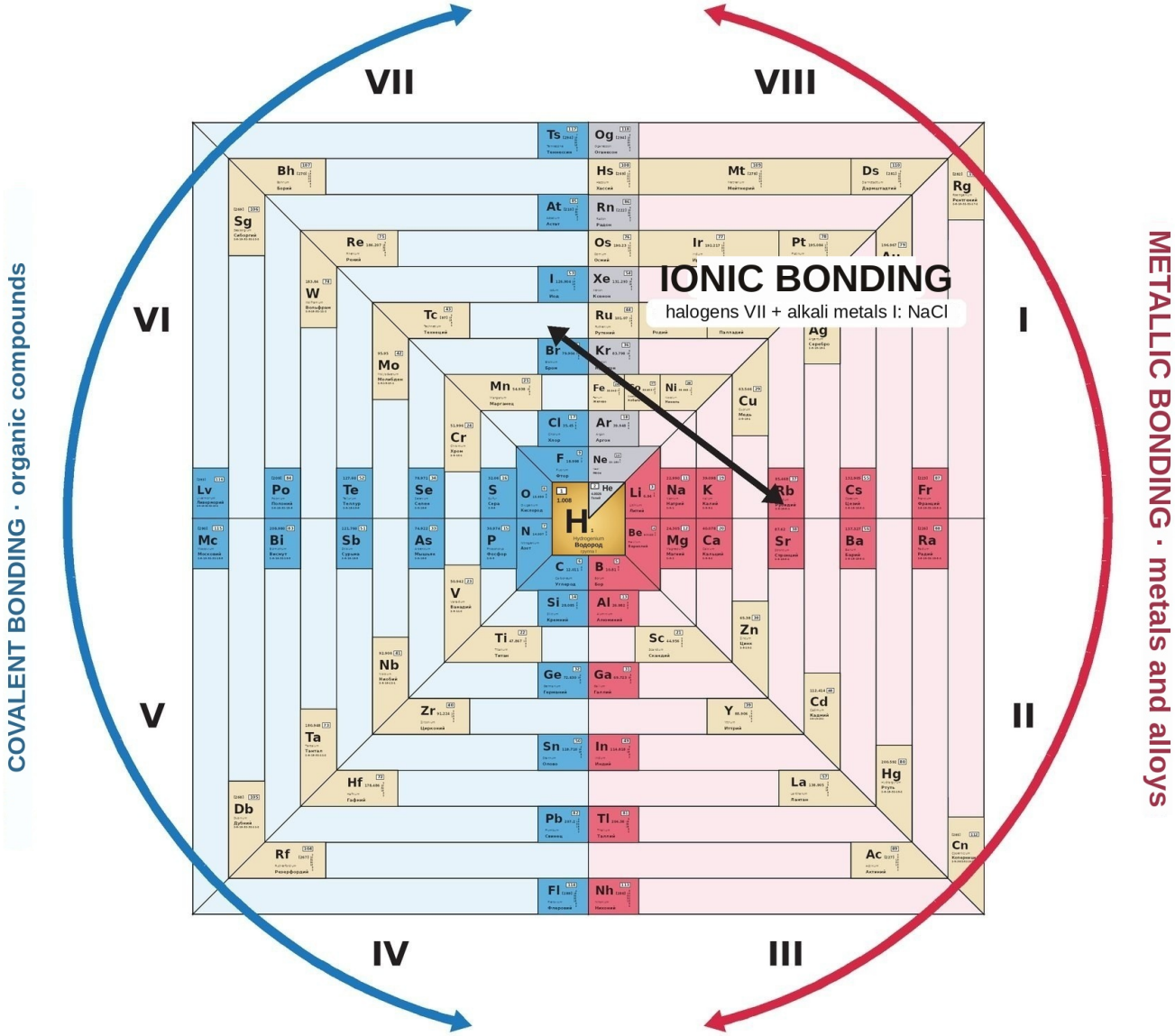


Table 19. State of matter at 25 °C — main groups

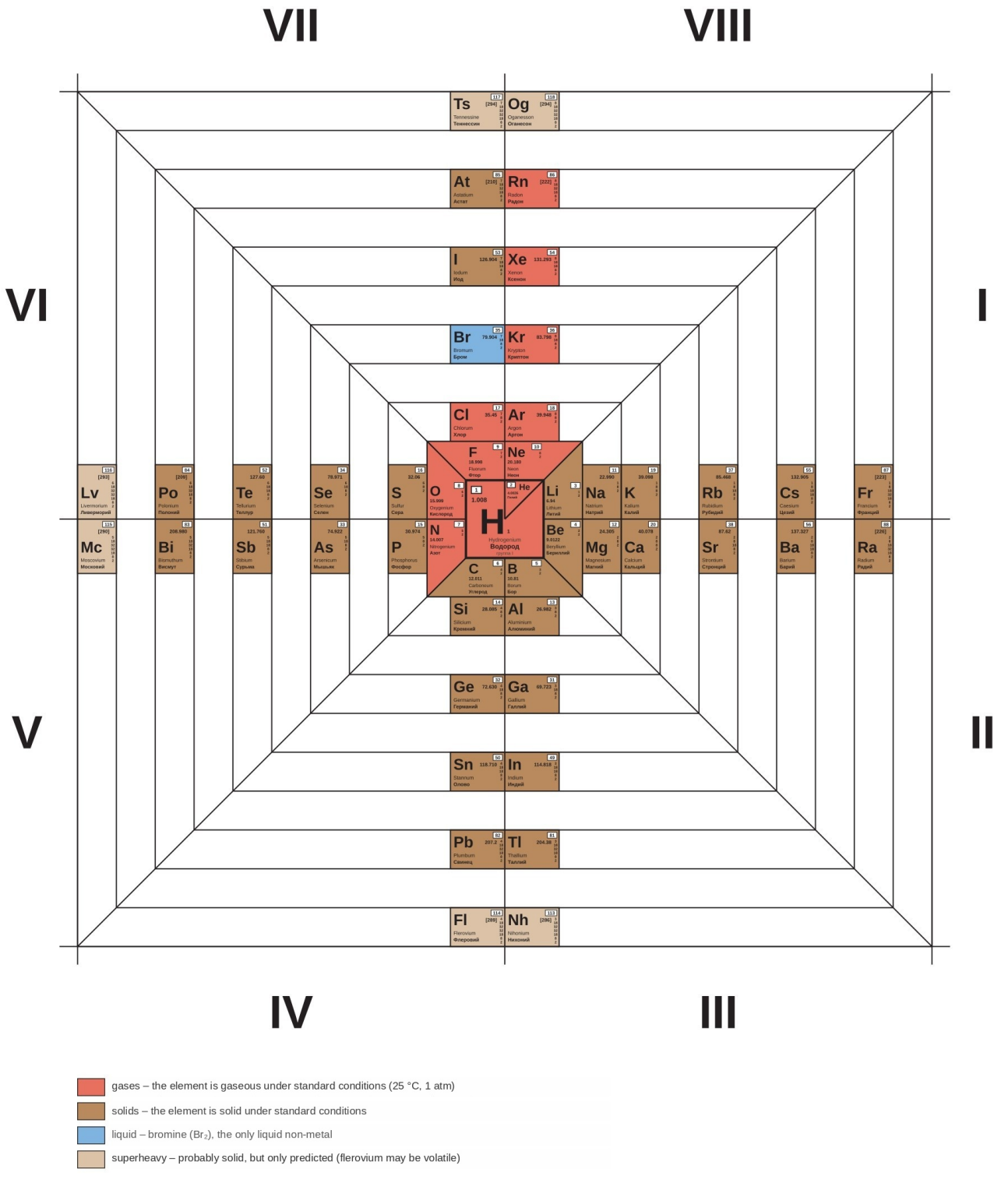


Table 20. State of matter at 25 °C — all elements

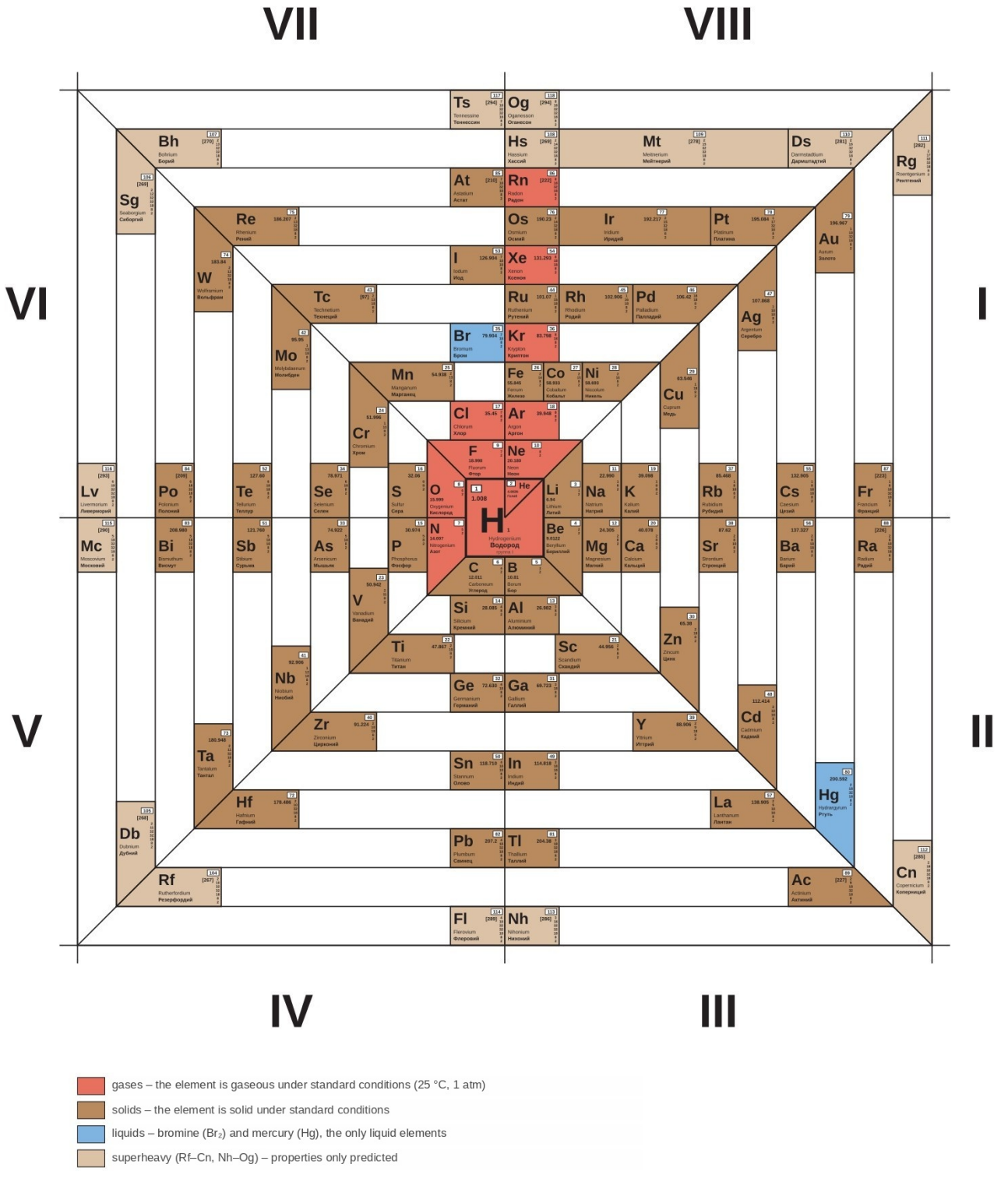


Table 21. Seasons and cardinal directions

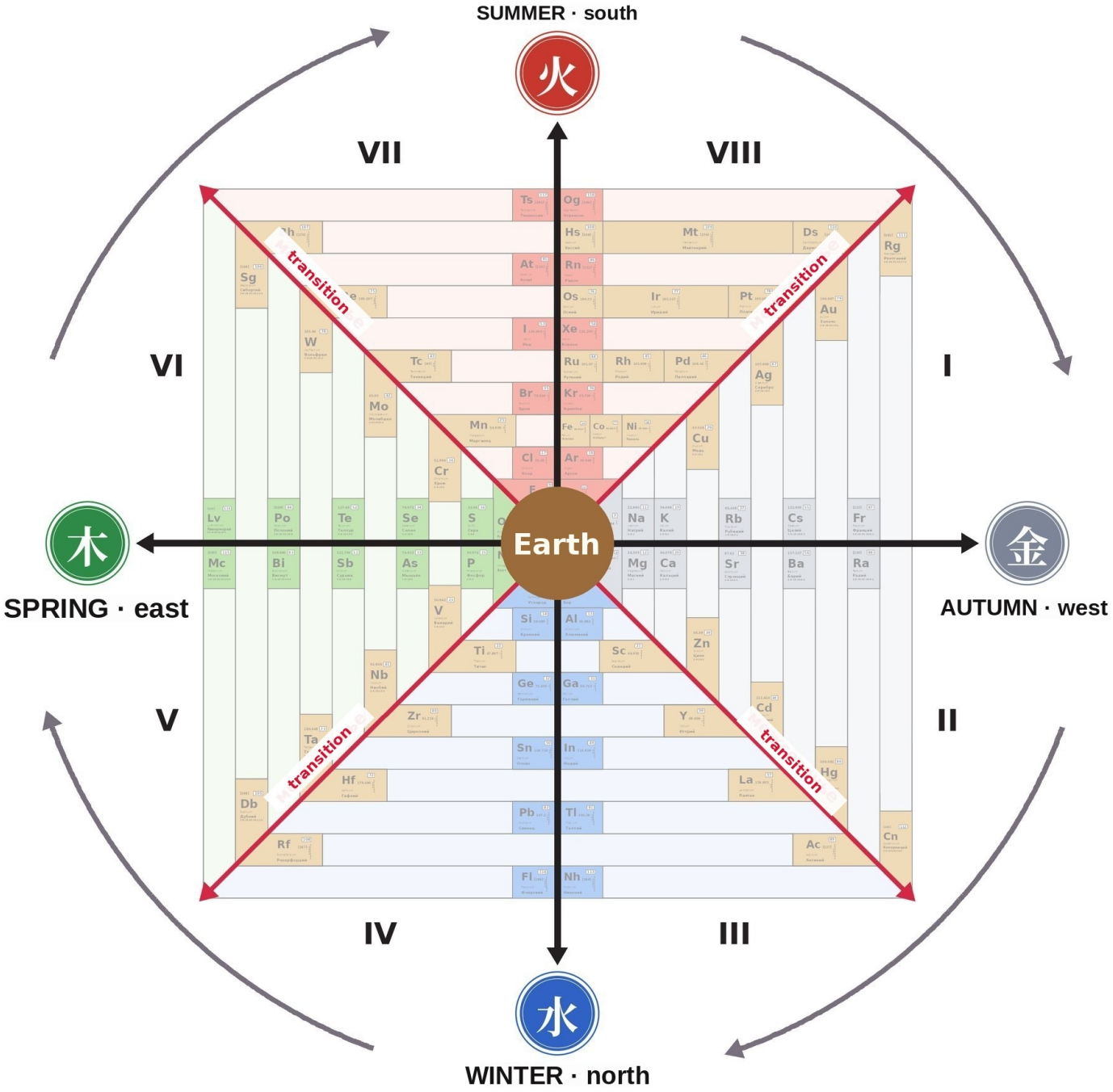


Table 22. The five shu points of the five elements

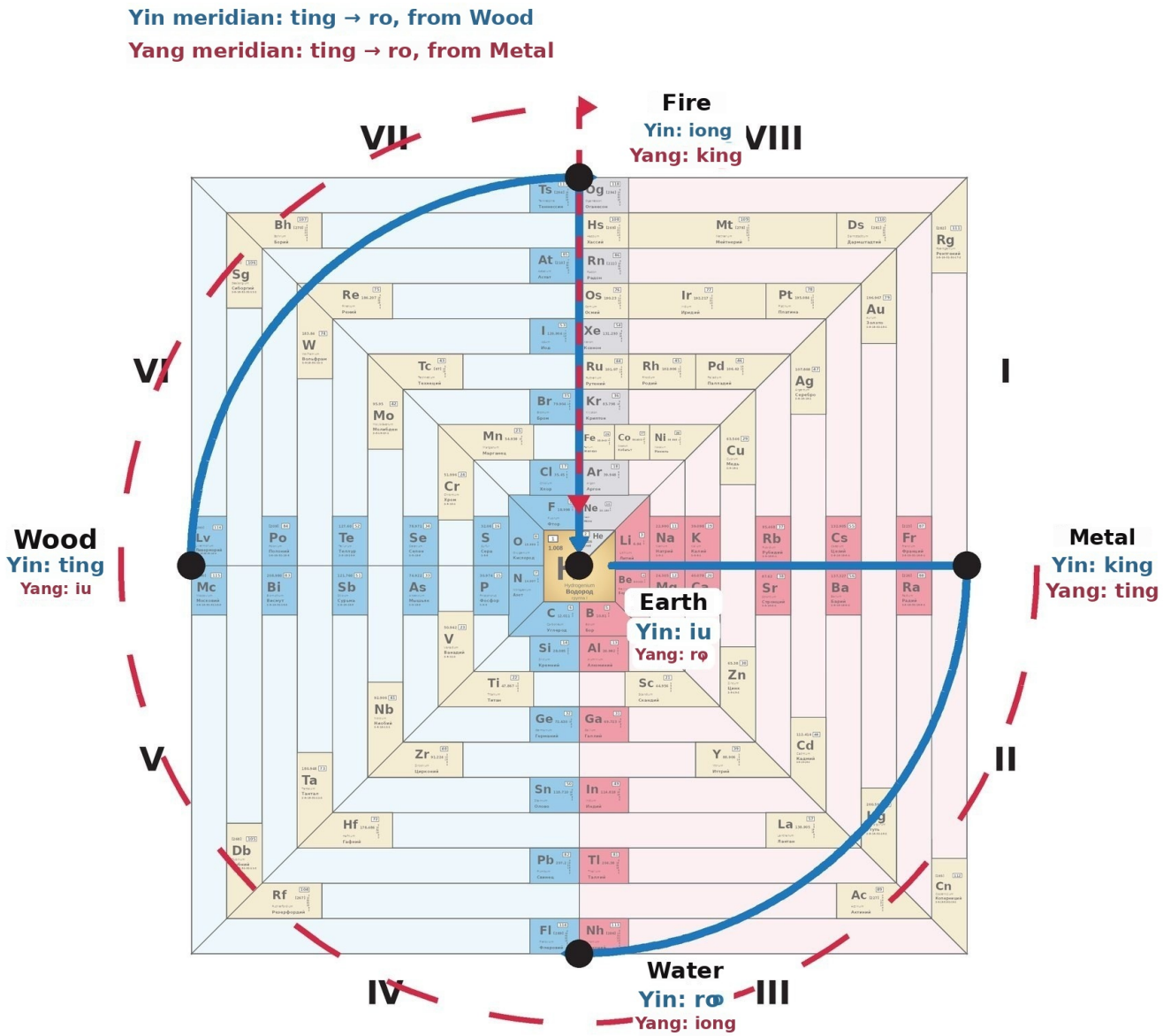


Table 23. Mandala of the main groups — light, square

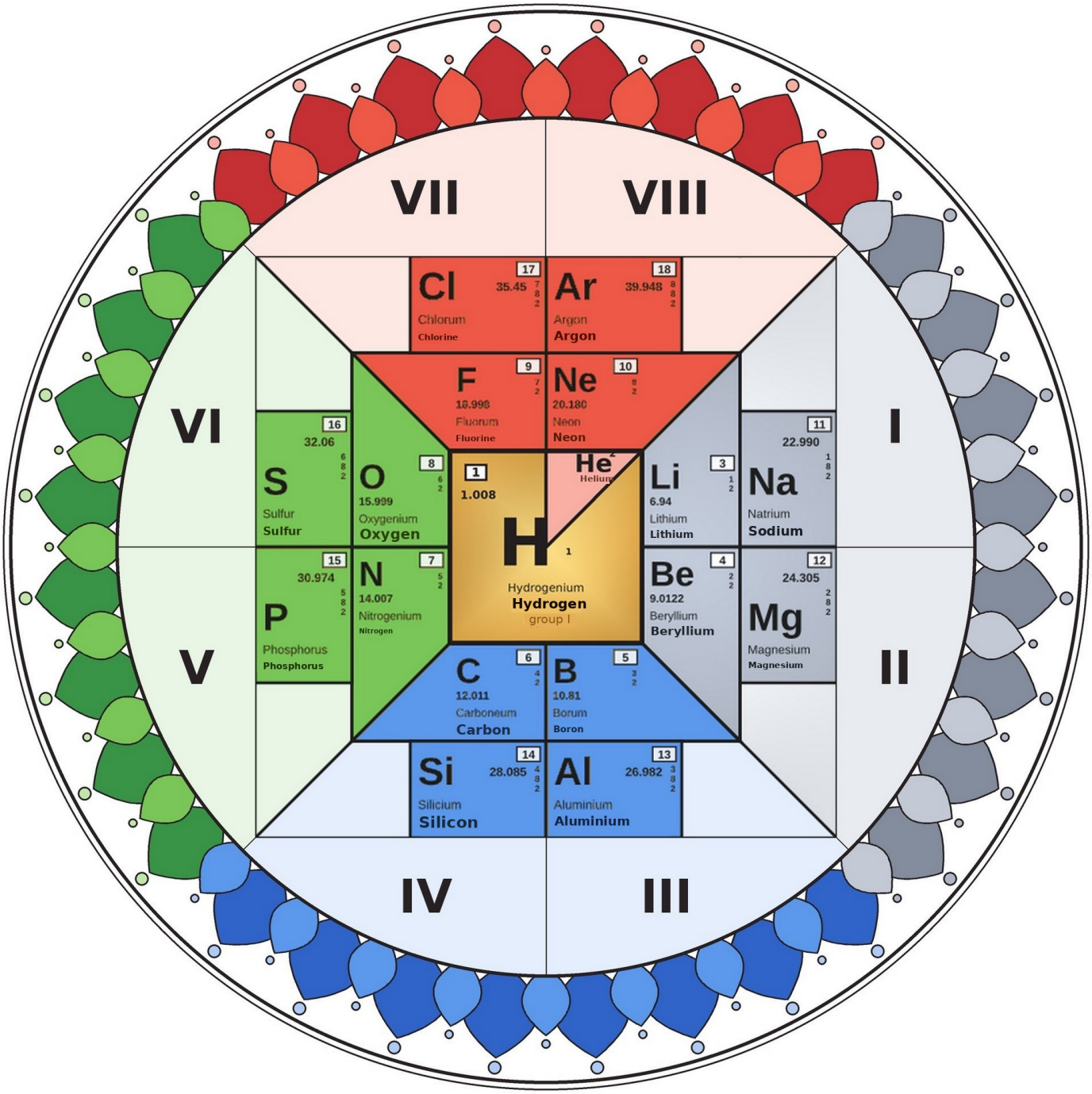


Table 24. Mandala of the main groups — dark, round

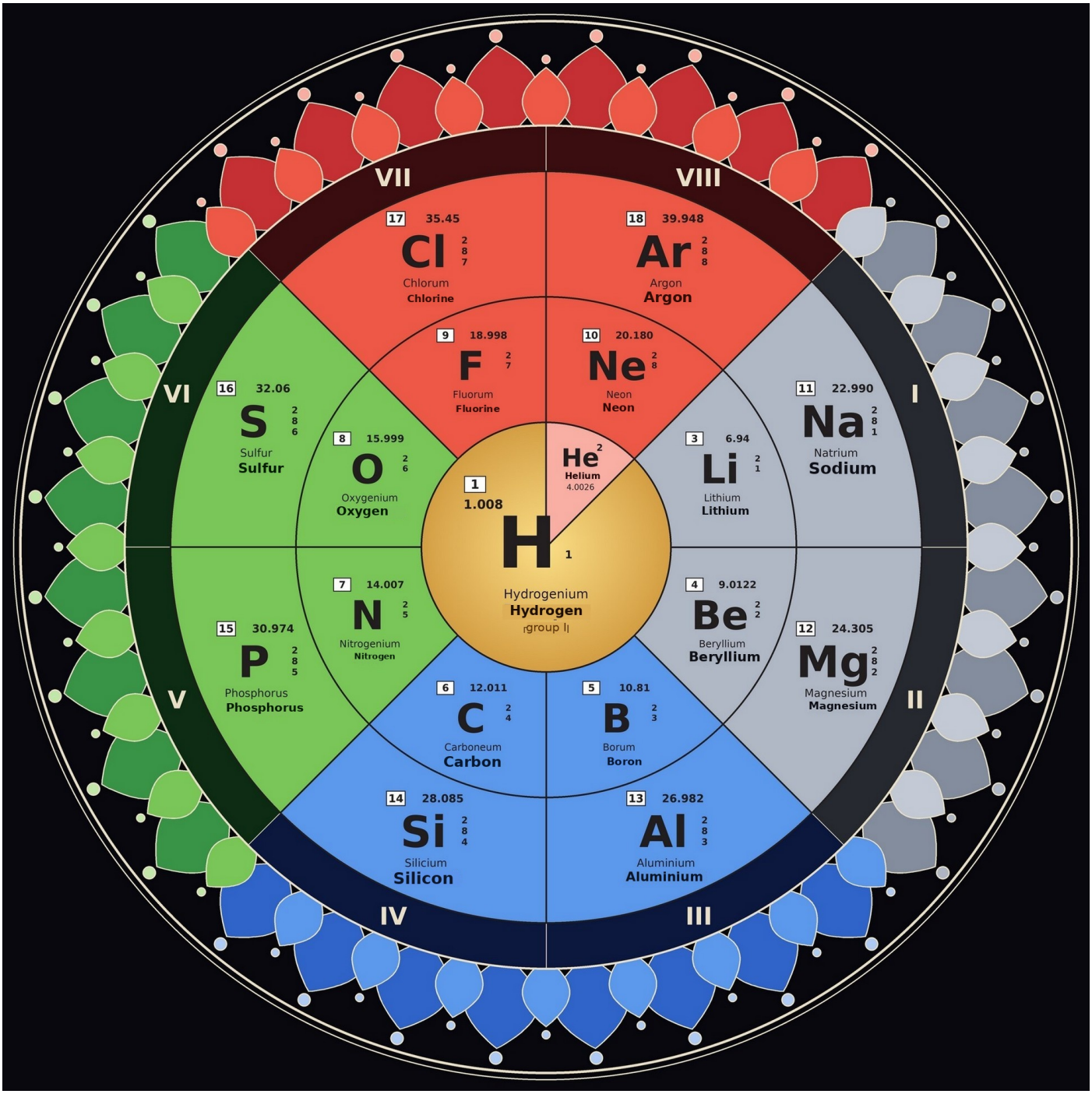


Table 25. Mandala with the complete radial table

