



# Trends in the Periodic Table

Property	Across periods	Down groups
Atomic radius	Moving left to right a decrease in atomic radius (due to increasing positive charge of the nucleus which attracts outermost electrons, adding electrons to the outermost shell but not adding shells)	Increase in atomic radius (each new period adds another electron energy level or shell that is more distant from the nucleus, the extra electron shells offset the extra nuclear charge)
Ionization energy	Increase in ionization energy across the period reaching a maximum at the noble gases (due to each successive element having one more proton in the nucleus)	Decrease in first ionization energy level (because valence electrons are further from the nucleus in each successive period)
Melting point	Rises to elements in group IV and then decreases	Decreases down the groups
Boiling point	Rises to elements in group IV and then decreases	Decreases down the groups
Electronegativity (the ability of an element to attract the electrons of another atom in a bond)	Increase in electronegativity left to right (as atomic radius decreases the outer (valence) shell is closer to the nucleus, therefore electrons being accepted from other atoms are closer to the nucleus – that is they are more strongly attracted and electronegativity is higher)	Decrease in electronegativity (because atomic radius increases outer electrons are further from the nucleus, therefore bonding electrons are not attracted so tightly and electronegativity is lower)
Electrical conductivity	Remains high for the metals and then decreases for the non-metals	
Thermal conductivity	Decreases	
Bonding	Varies from metallic to covalent network to covalent molecular (left to right)	
Element (metal, semi metals, non-metals)	Metals, semi-metals, non-metals	Increase in metallic character
Combining power (valency)	Increases to group IV and then decreases	Valency is the same down a group

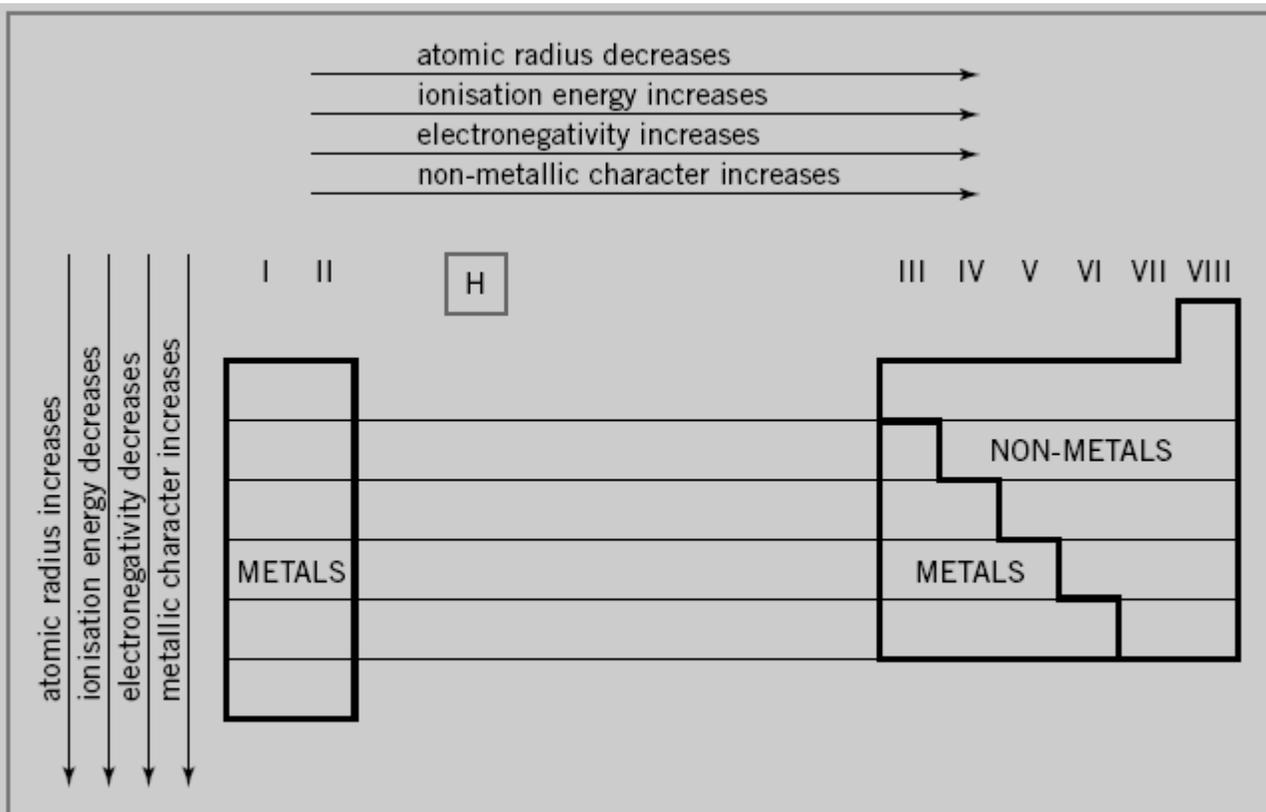


Figure 8.18 Trends in the periodic table

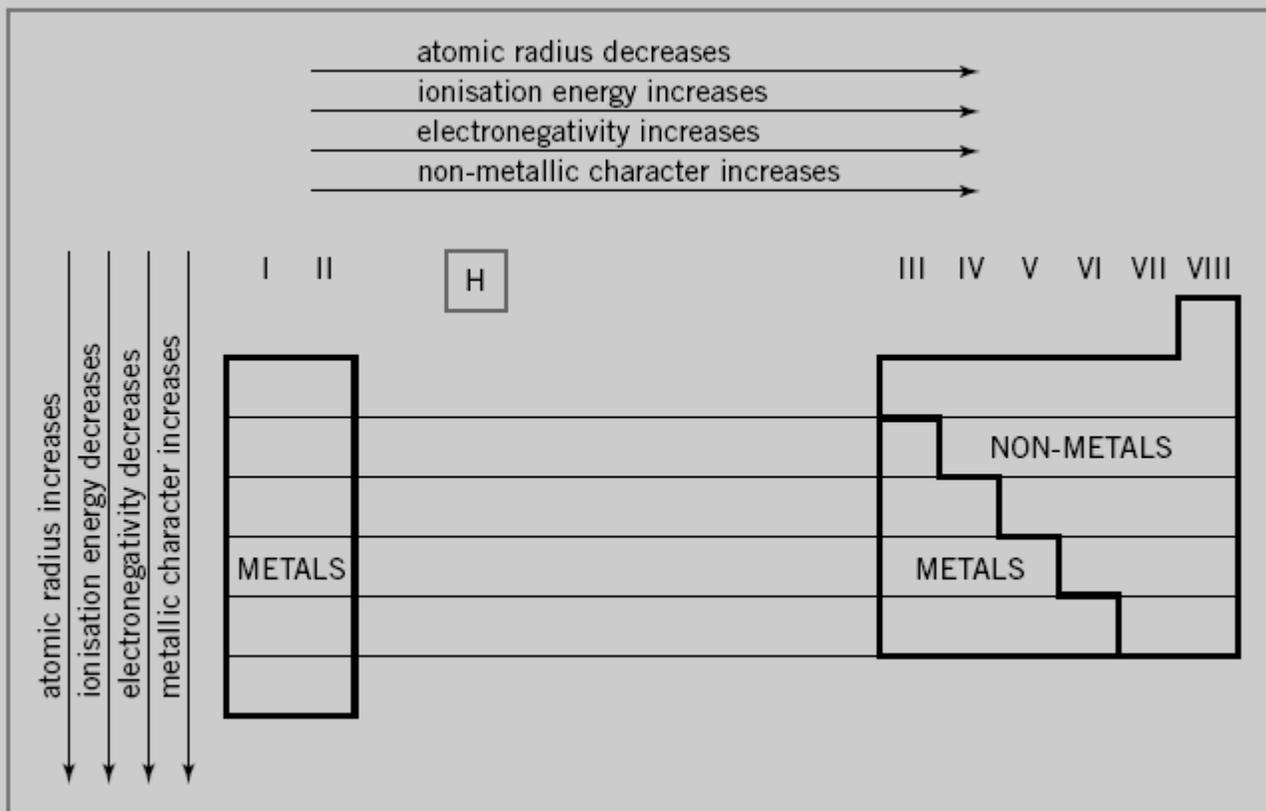


Figure 8.18 Trends in the periodic table