

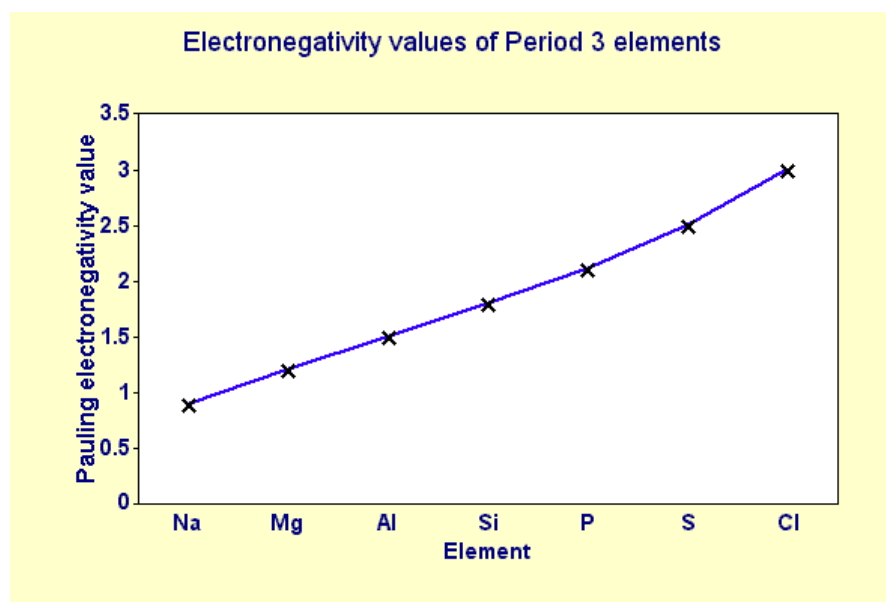
Trend in electronegativity of Period 3 elements

Electronegativity **increases** going **across** Period 3.

Table of physical data

Element	Proton number	Symbol	Atomic radius (nm)
sodium	11	Na	0.9
magnesium	12	Mg	1.2
aluminium	13	Al	1.5
silicon	14	Si	1.8
phosphorus	15	P	2.1
sulphur	16	S	2.5
chlorine	17	Cl	3.0

Graph of physical data



Explanation of this trend

Electronegativity is the relative ability of an atom to attract the bonding electron pair in a covalent bond (to withdraw electron density). It cannot be measured directly.

In the Pauling electronegativity index, the most electronegative element (fluorine) is given an electronegativity value of 4.

Note that there are no values for the noble gases (Group 0) as they do not usually form covalent bonds.

Going across Period 3:

- the nuclear charge increases ...
- the atomic radius decreases ...
- there are more electrons, but the increase in shielding is negligible because each extra electron enters the same principal energy level ...
- so electrons will be more strongly attracted to the nucleus.

Remember that ionisation energies are all endothermic processes (i.e. energy is needed to remove electrons), so atoms with low electronegativities do not have a tendency to lose electrons. They just have a weaker tendency than other atoms to attract the bonding electron pair in a covalent bond.

In Period 3, sodium with 11 protons is the least electronegative element, and chlorine with 17 protons is the most electronegative element. You might expect argon (with 18 electrons) to be the most electronegative element in Period 3, but its outer energy levels are full. Therefore, it does not form covalent bonds with other atoms, so it is given an electronegativity value of zero.