

# Periodic Trends Data and Plots

Chemistry  
The Pingry School

## Successive Ionization Energies (kJ/mol) for Na to Ar

	Na	Mg	Al	Si	P	S	Cl	Ar
1st IE	495	735	580	780	1060	1005	1255	1527
2nd IE	4560	1445	1815	1575	1890	2260	2295	2665
3rd IE		7730	2740	3220	2905	3375	3850	3945
4th IE			11600	4350	4950	4565	5160	5770
5th IE				16100	6270	6950	6560	7230
6th IE	Inner Electrons				21200	8490	9360	8780
7th IE					27000	11000	12000	

## First Ionization Energies (kJ/mol) for Main Group Elements in Periods 1 through 4

							H	He
							1312	2372
Li	Be	B	C	N	O	F	Ne	
520	900	801	1086	1402	1314	1681	2081	
Na	Mg	Al	Si	P	S	Cl	Ar	
495	735	680	780	1060	1005	1255	1527	
K	Ca	Ga	Ge	As	Se	Br	Kr	
419	590	579	762	944	941	1140	1351	

## Electron Affinities (kJ/mol) for Main Group Elements in Periods 1 through 4

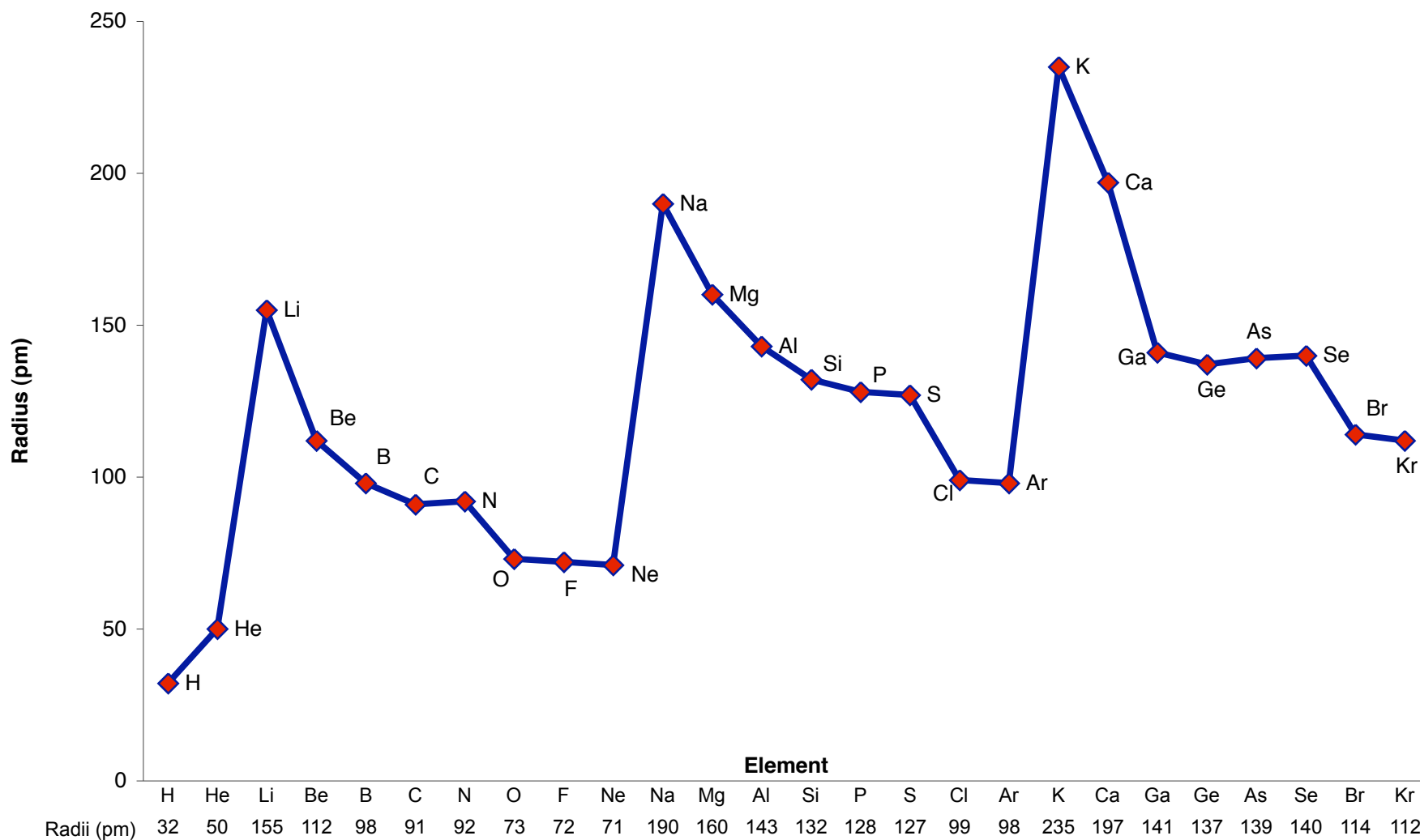
							H	He
							-72.4	19.3
Li	Be	B	C	N	O	F	Ne	
-59.8	241.2	-23.2	-122.5	0.0	-140.9	-322.3	28.9	
Na	Mg	Al	Si	P	S	Cl	Ar	
-53.1	23.2	44.4	-119.6	-74.3	-200.7	-348.3	34.7	
K	Ca	Ga	Ge	As	Se	Br	Kr	
-48.2	154.4	-38.6	-115.8	-77.2	-194.9	-324.2	38.6	

## Covalent Atomic Radii (in picometers) for Main Group Elements in Periods 1 through 4

							H	He
							32	50
Li	Be	B	C	N	O	F	Ne	
155	112	98	91	92	73	72	71	
Na	Mg	Al	Si	P	S	Cl	Ar	
190	160	143	132	128	127	99	98	
K	Ca	Ga	Ge	As	Se	Br	Kr	
235	197	141	137	139	140	114	112	

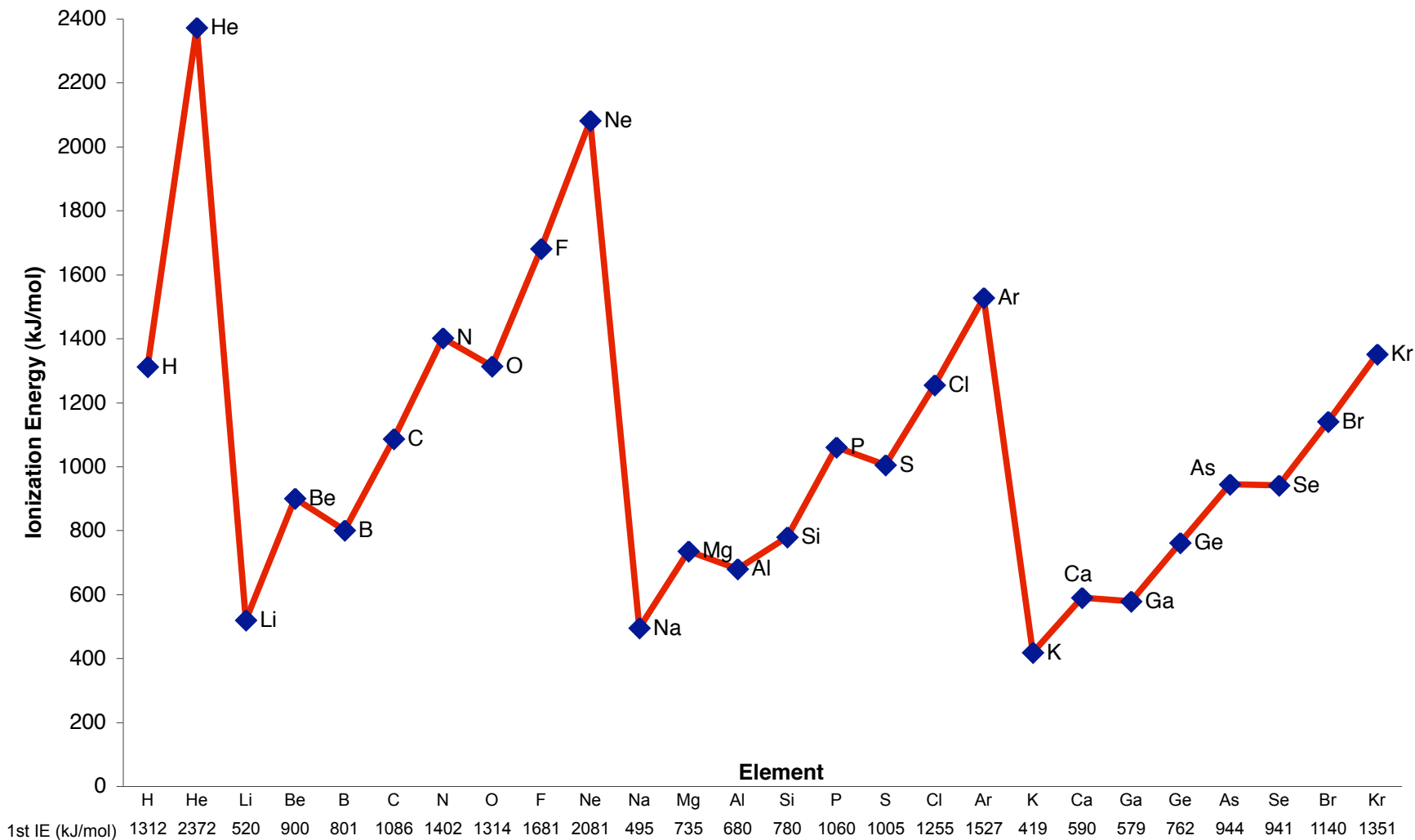
## Pauling Electronegativity Values for Selected Elements

H															B	C	N	O	F
2.1															2.0	2.5	3.0	3.5	4.0
Li	Be											Al	Si	P	S	Cl			
1.0	1.5											1.5	1.8	2.1	2.5	3.0			
Na	Mg	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	
0.9	1.2	0.8	1.0	1.3	1.5	1.6	1.6	1.5	1.8	1.9	1.9	1.9	1.6	1.6	1.8	2.0	2.4	2.8	
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Pb	Ag	Cd	In	Sn	Sb	Te	I		
0.8	1.0	1.2	1.4	1.6	1.8	1.9	2.2	2.2	2.2	1.9	1.7	1.6	1.6	1.8	1.9	2.1	2.5		
Cs	Ba		Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At			
0.7	0.9		1.3	1.5	1.7	1.9	2.2	2.2	2.2	2.4	1.9	1.8	1.9	1.9	2.0	2.2			
Fr	Ra																		
0.7	0.9																		

**Covalent Atomic Radii (in Picometers)**

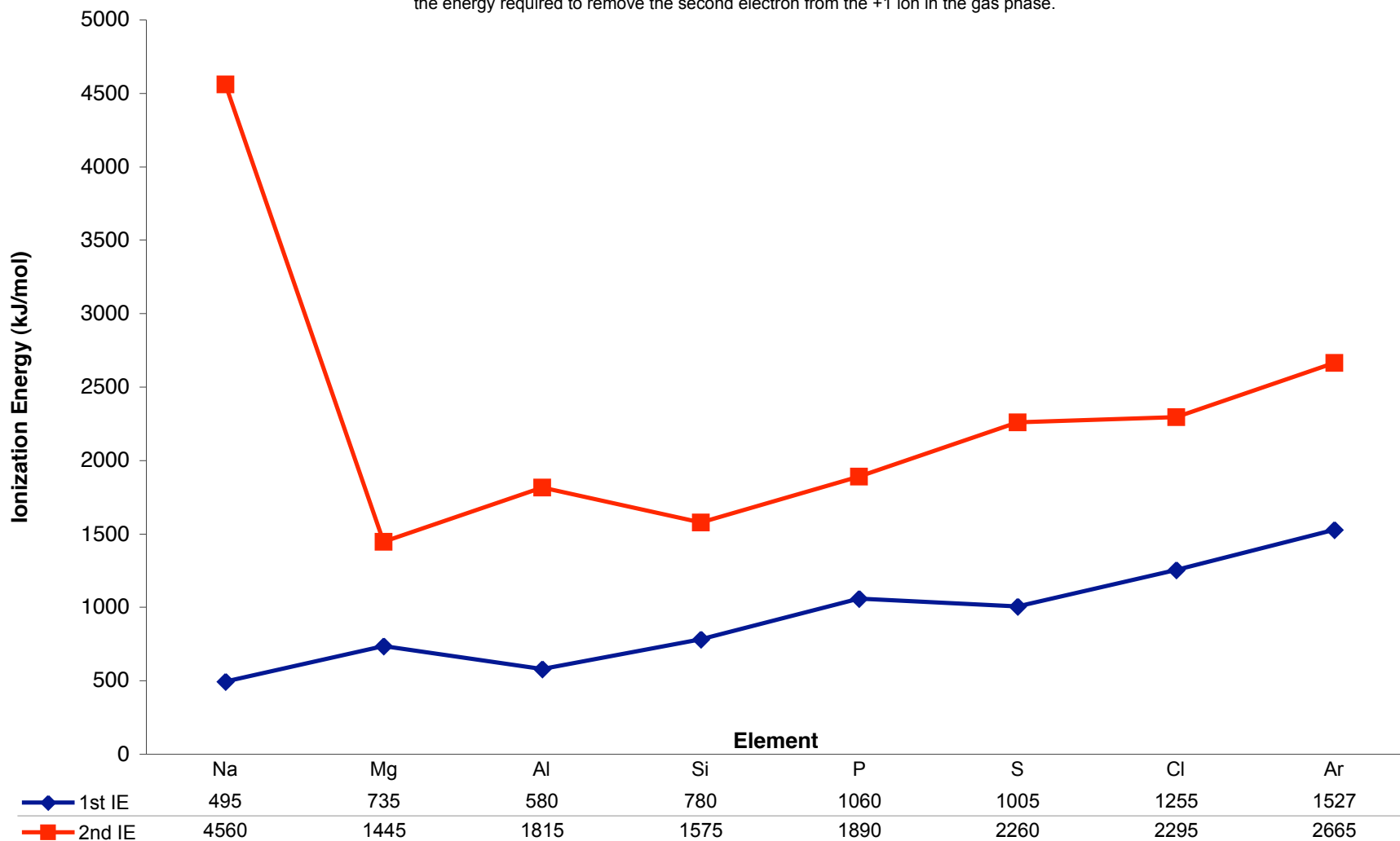
## First Ionization Energies (kJ/mol) for H to Kr (Main Group Elements only)

The first ionization energy is the energy required to remove a single electron from an atom in the gas phase.



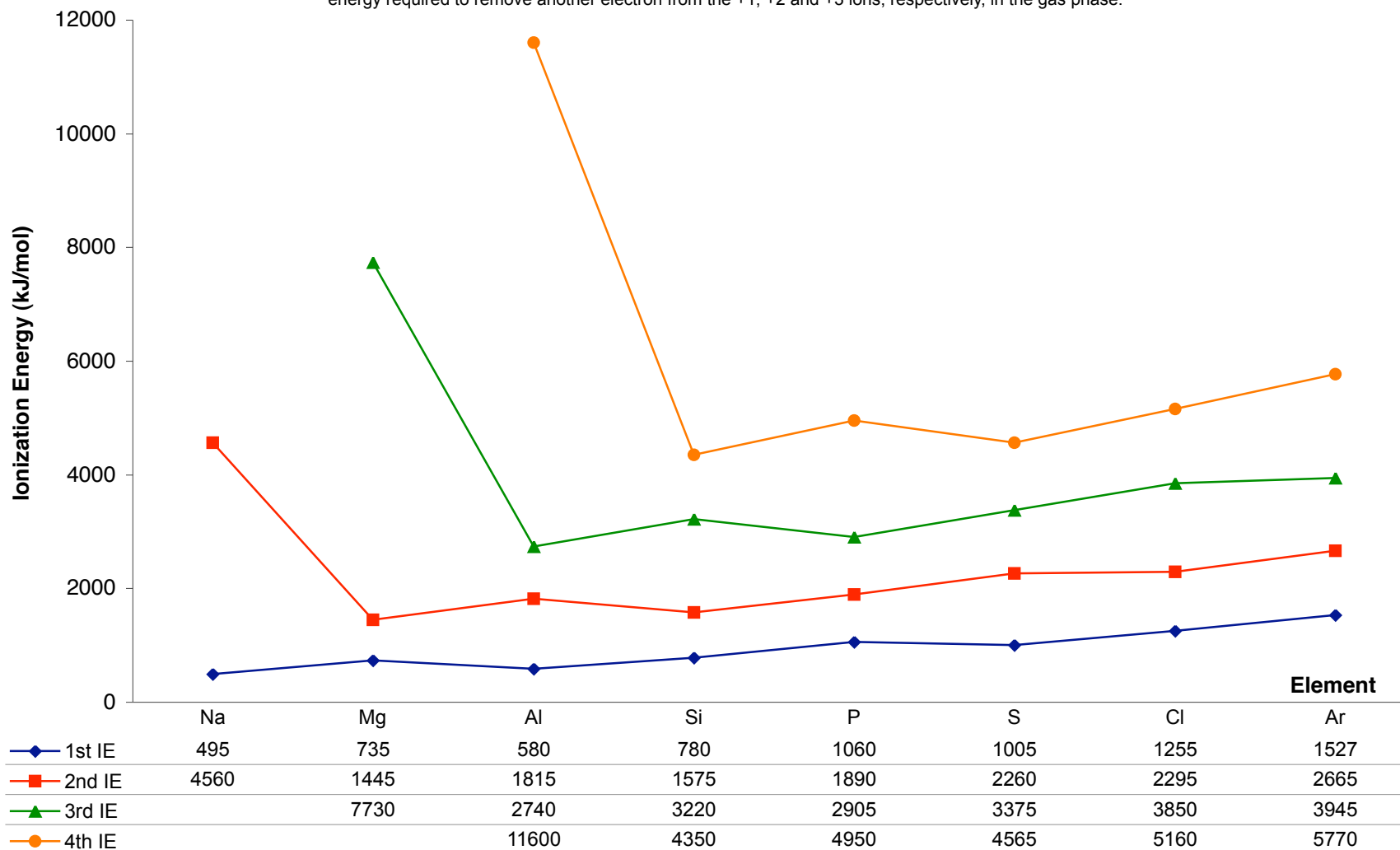
## 1st and 2nd Ionization Energies for Na to Ar

The first ionization energy is the energy required to remove a single electron from an atom in the gas phase. The second ionization energy is the energy required to remove the second electron from the +1 ion in the gas phase.



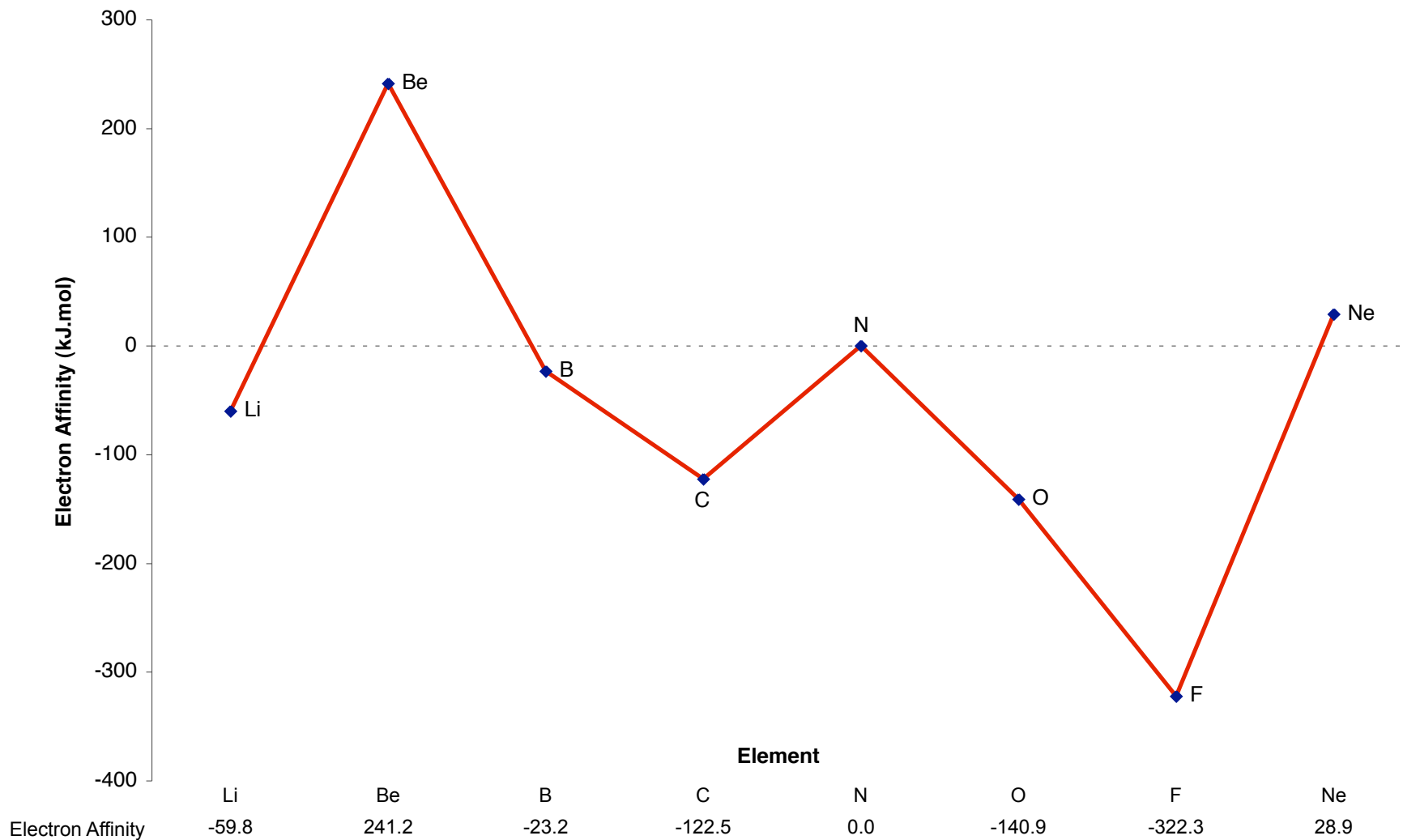
## First Four Ionization Energies for Na to Ar

The first ionization energy is the energy required to remove a single electron from an atom in the gas phase. The second, third and fourth ionization energies represent the energy required to remove another electron from the +1, +2 and +3 ions, respectively, in the gas phase.



### Electron Affinities for Li to Ne

Electron affinity is the energy added (endothermic) or given off (exothermic) when an electron is added to the neutral atom in the gas phase. A positive electron affinity implies that the atom has a poor affinity for an extra electron. A negative value implies that the atom has a strong affinity for an extra electron.



### Pauling Electronegativity Values

Electronegativity values are a relative measure of an atom's attraction for electrons when it bonds with another atom. Fluorine (F) has the highest electronegativity and is assigned a value of 4.0

