

Trend Problems #2

1. Which element is more reactive?

a.

Element	Radius	Ionization Energy
Na	2.23	5.139
Na ¹⁺		
Ca	2.23	6.113
Rb	2.95	4.177

b.

Element	Radius	Electron Affinity
N	0.75	3.04
S	1.09	2.58
S ²⁻		
Br	1.12	2.96

c. OMIT this one

Element	Radius	Electron Affinity
N	0.75	3.04
S	1.09	2.58
S ²⁻		
Br	1.12	2.96

2. Explain the differences in ionization energy.

a.

Element	Radius	Ionization Energy
Mg	1.72	7.646
Mg ²⁺	"0.51"	"21.564"
Ca	2.23	6.113
Sr	2.45	5.695

b.

Element	Radius	Ionization Energy
Sc	2.09	6.56
Ti	2.00	6.83
Y	2.27	6.22

3. Explain the differences in electron affinity.

a.

Element	Radius	Electron Affinity
C	0.91	2.25
N	0.75	3.04
N ³⁻		
P	1.23	2.19

b.

Element	Radius	Electron Affinity
As	1.33	2.18
As ³⁺	Like 2n but 1.33	smaller 2.18
As ³⁻		

4. Which elements is more reactive?

a.

Element	Radius	Ionization Energy
V	1.92	6.75
V ⁵⁺	Like Ar but radius +	smaller larger IE
Cr	1.85	6.766
Ti	2.00	6.83

b.

Element	Radius	Ionization Energy
Mn	1.79	7.434
Mn ⁷⁺	Like Ar but radius +	smaller higher IE
Fe	1.72	7.902
Fe ⁺³	1.92	6.75

c.

Element	Radius	Electron Affinity
S ²⁻	Like Ar but larger due to protons	
S	1.46	1.90
P	1.23	2.19
Cl	0.97	3.16

5. Explain the differences in atomic radius.

a.

Element	Radius
Mg	1.72
Ca	2.23
Ca ²⁺	~0.88
Sc	2.09

b.

Element	Radius
P	7.434
P ³⁻	Like Ar but larger (less protons)
P ⁵⁺	Like Ne but smaller (more protons)

c.

Element	Radius
Y	2.27
Y ³⁺	Like Kr but smaller
Zr	2.16
Zr ⁴⁺	Like Kr but smaller