

Ionization Energies

(all values in kJ/mol)

number	symbol	element	0 --> +1	+1 --> +2	+2 --> +3	+3 --> +4	+4 --> +5	+5 --> +6	+6 --> +7	+7 --> +8
1	H	hydrogen	1,312							
2	He	helium	2,372	5,251						
3	Li	lithium	520	7,298	11,815					
4	Be	beryllium	900	1,757	14,849	21,007				
5	B	boron	801	2,427	3,660	25,026	32,827			
6	C	carbon	1,087	2,353	4,621	6,223	37,831	47,277		
7	N	nitrogen	1,402	2,856	4,578	7,475	9,445	53,267	64,360	
8	O	oxygen	1,314	3,388	5,301	7,469	10,990	13,327	71,330	84,078
9	F	fluorine	1,681	3,374	6,050	8,408	11,023	15,164	17,868	92,038
10	Ne	neon	2,081	3,952	6,122	9,371	12,177	15,238	19,999	23,070
11	Na	sodium	496	4,562	6,910	9,543	13,354	16,613	20,117	25,496
12	Mg	magnesium	738	1,451	7,733	10,543	13,630	18,020	21,711	25,661
13	Al	aluminum	578	1,817	2,745	11,577	14,842	18,379	23,326	27,465
14	Si	silicon	787	1,577	3,232	4,356	16,091	19,805	23,780	29,287
15	P	phosphorous	1,012	1,907	2,914	4,964	6,274	21,267	25,431	29,872
16	S	sulfur	1,000	2,252	3,357	4,556	7,004	8,496	27,107	31,719
17	Cl	chlorine	1,251	2,298	3,822	5,159	6,542	9,362	11,018	33,604
18	Ar	argon	1,521	2,666	3,931	5,771	7,238	8,781	11,995	13,842
19	K	potassium	419	3,052	4,420	5,877	7,975	9,590	11,343	14,944
20	Ca	calcium	590	1,145	4,912	6,491	8,153	10,496	12,270	14,206
21	Sc	scandium	633	1,235	2,389	7,091	8,843	10,679	13,310	15,250
22	Ti	titanium	659	1,310	2,653	4,175	9,581	11,533	13,590	16,440
23	V	vanadium	651	1,414	2,830	4,507	6,299	12,363	14,530	16,730
24	Cr	chromium	653	1,591	2,987	4,743	6,702	8,745	15,455	17,820
25	Mn	manganese	717	1,509	3,248	4,940	6,990	9,220	11,500	18,770
26	Fe	iron	763	1,562	2,957	5,290	7,240	9,560	12,060	14,580
27	Co	cobalt	760	1,648	3,232	4,950	7,670	9,840	12,440	15,230
28	Ni	nickel	737	1,753	3,395	5,300	7,339	10,400	12,800	15,600
29	Cu	copper	746	1,958	3,555	5,536	7,700	9,900	13,400	16,000
30	Zn	zinc	906	1,733	3,833	5,731	7,970	10,400	12,900	16,800
31	Ga	gallium	579	1,979	2,963	6,180				
32	Ge	germanium	762	1,538	3,302	4,411	9,020			
33	As	arsenic	947	1,798	2,735	4,837	6,043	12,310		
34	Se	selenium	941	2,045	2,974	4,144	6,590	7,880	14,990	
35	Br	bromine	1,140	2,103	3,470	4,560	5,760	8,550	9,940	18,600
36	Kr	krypton	1,351	2,350	3,565	5,070	6,240	7,570	10,710	12,138
37	Rb	rubidium	403	2,633	3,860	5,080	6,850	8,140	9,570	13,120
38	Sr	strontium	550	1,064	4,138	5,500	6,910	8,760	10,230	11,800
39	Y	yttrium	600	1,180	1,980	5,847	7,430	8,970	11,190	12,450
40	Zr	zirconium	640	1,270	2,218	3,313	7,752	9,500		
41	Nb	niobium	652	1,380	2,416	3,700	4,877	9,847	12,100	
42	Mo	molybdenum	684	1,560	2,618	4,480	5,257	6,641	12,125	13,860
43	Tc	technetium	702	1,470	2,850					
44	Ru	ruthenium	710	1,620	2,747					
45	Rh	rhodium	720	1,740	2,997					
46	Pd	palladium	804	1,870	3,177					
47	Ag	silver	731	2,070	3,361					
48	Cd	cadmium	868	1,631	3,616					
49	In	indium	558	1,821	2,704	5,210				
50	Sn	tin	709	1,412	2,943	3,930	7,456			
51	Sb	antimony	834	1,595	2,440	4,260	5,400			
52	Te	tellurium	869	1,790	2,698	3,610	5,668			
53	I	iodine	1,008	1,846	3,180					
54	Xe	xenon	1,170	2,046	3,099					