

Shorthand Noble Gas Electron Configurations

Follow these steps to write shorthand noble gas electron configurations.

Step 1: Find the symbol for the element on a periodic table.

For example, to write an abbreviated electron configuration for zinc atoms, we first find Zn on the periodic table (see below).

Step 2: Write the symbol in brackets for the noble gas located at the far right of the period above the element you wish to describe.

For zinc, we move up to the third period and across to Ar (see below). To describe the first 18 electrons of a zinc atom, we write "[Ar]".

Step 3: Move back down a row (to the row containing the element you wish to describe) and to the far left. Following the elements in the row from left to right, write the outer-electron configuration associated with each column until you reach the element you are describing.

*For zinc, we need to describe the 19th through the 30th electrons. The atomic numbers 19 and 20 are in the fourth row of the s block, so the 19th and 20th electrons for each zinc atom enter the 4s² sublevel. The atomic numbers 21 through 30 are in the first row of the d block, so the 21st to the 30th electrons for each zinc atom fill the 3d sublevel (see below). Zinc, with atomic number 30, has the abbreviated configuration **[Ar] 4s² 3d¹⁰***

Step 1 Find the symbol for the element (zinc).

Step 2 Write the symbol in brackets for the nearest, smaller noble gas.

Step 3 Write the outer electron configuration for the remaining electrons.

	1	2											13	14	15	16	17	18
	1A	2A											3A	4A	5A	6A	7A	8A
2	3	4											5	6	7	8	9	10
	Li	Be											B	C	N	O	F	Ne
3	11	12	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Na	Mg	3B	4B	5B	6B	7B	8B	8B	8B	1B	2B	Al	Si	P	S	Cl	Ar
4	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
5	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
	Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
6	55	56	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86
	Cs	Ba	Lu	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
7	87	88	103	104	105	106	107	108	109	110	111	112						
	Fr	Ra	Lr	Rf	Db	Sg	Bh	Hs	Mt	Ds	Uuu	Uub		Uuq		Uuh		
			57	58	59	60	61	62	63	64	65	66	67	68	69	70		
			La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb		
			89	90	91	92	93	94	95	96	97	98	99	100	101	102		
			Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No		

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Directions: Use the periodic table to fill in the following data table with the appropriate information.

Element	Atomic Number	# of electrons	Shorthand Electron Configuration	How many valence electrons?	Lewis Valence Electron Dot Diagram
Thallium					
Germanium					
Lead					
	85				
		54			
Iodine					
	20				
Neon					
	31				
Xenon					
Chlorine					
	12				
		9			