

CONCEPT: THE ELECTRON CONFIGURATION: EXCEPTIONS

Electron Orbital Stability

- *p* and *d* subshell orbitals are most stable when they are half-filled or totally-filled with electrons because of symmetry.

Symmetrical Distribution									
Half-Filled					Totally-Filled				
p					p				
d					d				

Exceptions to Electron Configurations

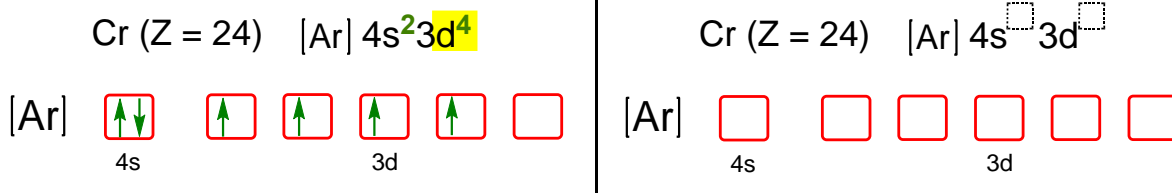
- Starting from chromium, as the atomic number (Z) _____, **exceptions** to electron configurations can be observed.

MEMORY TOOL

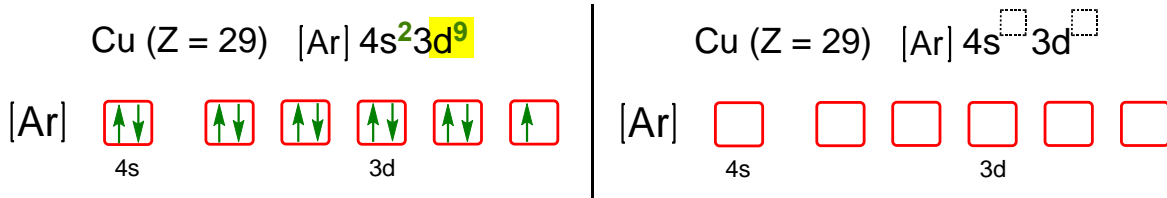
Chromium (Z = 24) and there are 2 and 4. To get to the other column remember 2 skip next 4.

	3B	4B	5B	6B	7B	8B			1B	2B
	3	4	5	6	7	8	9	10	11	12
Period 4	21 Sc	22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn
Period 5	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd
Period 6	57 La	72 Hf	73 Ta	74 W	75 Re	76 Os	77 Ir	78 Pt	79 Au	80 Hg
Period 7	89 Ac	104 Rf	105 Db	106 Sg	107 Bh	108 Hs	109 Mt	110 Ds	111 Rg	112 Cn

- An s orbital electron can be promoted to create half-filled orbitals with _____ - elements.



- An s orbital electron can be promoted to create completely-filled orbitals with _____ - elements.



EXAMPLE: Based on the exceptions, provide the condensed electron configuration for the silver atom.

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PRACTICE: Illustrate the exception to the electron configuration of molybdenum.



PRACTICE: Which of the following is the correct electron configuration of gold?

- a) [Xe] $6s^2 4f^{14} 5d^9$
- b) [Ar] $5s^1 4f^{14} 5d^{10}$
- c) [Xe] $6s^1 5d^{10}$
- d) [Xe] $6s^1 4f^{14} 5d^{10}$
- e) [Xe] $6s^1 4f^{14} 5d^{10}$

PRACTICE: A comparison of the electron configurations of palladium (Pd) and silver (Ag) indicates that:

- a) Ag has 2 more d electrons and the same number of s electrons as Pd.
- b) Ag has 1 more d electron and the same number of s electrons as Pd.
- c) Ag has 2 more d electrons and 1 less s electron than Pd.
- d) Ag has 1 more d electron and 1 less s electron than Pd.
- e) Ag has 1 more d electron and 1 more s electron than Pd.