

## Answer on Question #44653 – Chemistry - Physical Chemistry

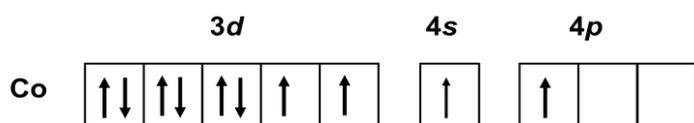
The vacancy of cobalt atom is 2 . Why not 6 because it needs 6 electrons to fulfill its last powershell according to the octet rule

### Answer

The electron structure of Co is:



As its external shell has only 2 electron (you can say in the other way – Co has 2 valence electrons), Co is more likely to lose electrons, than gain them. That's why, the vacancy of cobalt is 2, not 6. Cobalt, however, can have oxidation states of +1, +2, +3, or even +4 (Marshal Cavendish, "The elements. Cobalt", 2007). This variation is because of cobalt's unfilled inner electron shell, which can lose different numbers of electrons. In the excited state 4s electrons unpair:



Also the octet rule says that atom gains or loses electrons to obtain the external shell of noble gas. It doesn't always mean, that the number of electrons should always be eight.