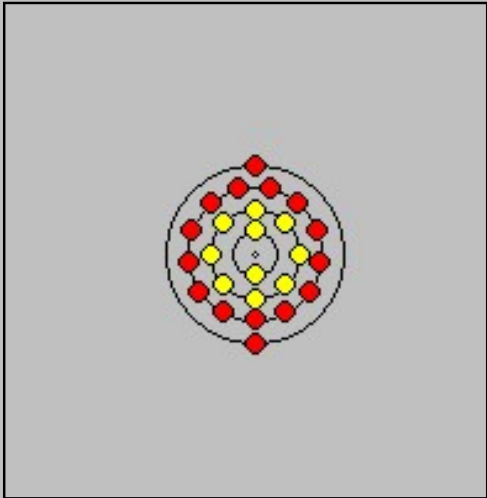




|                    |                    |                    |                    |                     |                     |
|--------------------|--------------------|--------------------|--------------------|---------------------|---------------------|
| <a href="#">Mn</a> | <a href="#">Tc</a> | <a href="#">Re</a> | <a href="#">Bh</a> | <a href="#">Ups</a> | <a href="#">Bns</a> |
| 25                 | 43                 | 75                 | 107                | 157                 | 207                 |

## Manganese

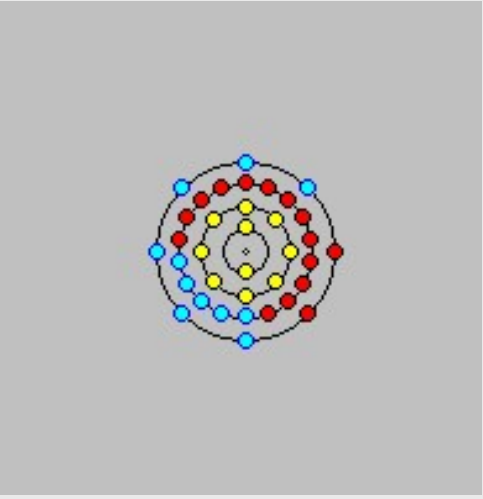
|   |  |
|---|--|
| Symbol  | Mn                                       |
| Atomic Number   | 25                                       |
| Relative Atomic Mass<br>$^{12}\text{C} = 12.0000$       | 54.938 049 ( $\pm 9$ ) [Since 1995]      |
| Atomic Radius pm  | 124                                      |
| First Ionisation Energy<br>$\text{kJ mol}^{-1}$         | 717.4                                    |
| Ionisation Energy (eV)                                  | 7.4340                                   |
| Electronegativity                                       | 1.55                                     |
| Density<br>$\text{kg m}^{-3}$                           | 7440 [ $\pm$ , 293 K]<br>6430 [l., m.p.] |
| Molar Volume $\text{cm}^3$                              | 7.38                                     |
| Thermal Conductivity<br>$\text{W m}^{-1} \text{K}^{-1}$ | 7.82 [300 K]                             |
| Melting Point K   | 1517                                     |
| Boiling Point K   | 2235                                     |
| Number of Isotopes                                      | 15                                       |
| Isotope Atomic mass/u Mole fraction                     | $^{55}\text{Mn}$ 54.938 0493(15) 1.0000  |
| Inner + outer Shells                                    | 2 + 2 = 4                                |
| Inner + outer Orbitals                                  | 10 + 15 = 25                             |
| Filling Orbital   | 3d <sup>5</sup>                          |
| Ground State Electron Configuration                     | [Ar] 3d <sup>5</sup> 4s <sup>2</sup>     |



2, 8, 13, 2

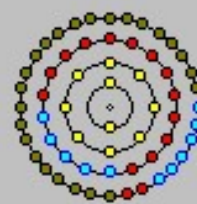
Ground State Electron Configuration with free Orbitals (n= 11)

0, 0, 5, 6



**Ground State Electron Configuration with compressed Orbitals (n= 24 )**

0, 0, 0, 24



**Singularity**

60 = 10 + 15 + 11 + 24

|   | s | p | d  | f  | g | h | i | j |
|---|---|---|----|----|---|---|---|---|
| 1 | 2 |   |    |    |   |   |   |   |
| 2 | 2 | 6 |    |    |   |   |   |   |
| 3 | 2 | 6 | 5  | 5  |   |   |   |   |
| 4 | 2 | 6 | 10 | 14 |   |   |   |   |
| 5 |   |   |    |    |   |   |   |   |
| 6 |   |   |    |    |   |   |   |   |
| 7 |   |   |    |    |   |   |   |   |

**Term Symbol**

$6S_{5/2}$

**Discovery**

It was discovered by the Swedish pharmacist and chemist [Carl-Wilhelm Scheele](#) in 1774. In 1774, the Swedish chemist [Johan Gottlieb Gahn](#) (Stockholm, Sweden) first isolated the metal.

**Name Derived From**

The name derives from the Latin magnes for "magnet" since pyrolusite (MnO<sub>2</sub>) has magnetic properties.