

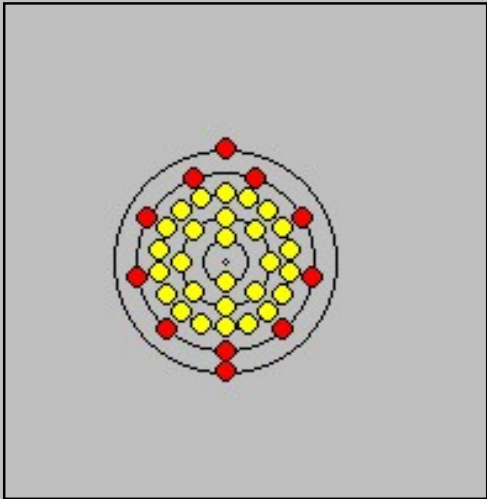


|                    |                   |                    |                    |                     |                     |                     |
|--------------------|-------------------|--------------------|--------------------|---------------------|---------------------|---------------------|
| <a href="#">Sc</a> | <a href="#">Y</a> | <a href="#">La</a> | <a href="#">Ac</a> | <a href="#">Ubu</a> | <a href="#">Usu</a> | <a href="#">Bbu</a> |
| 21                 | 39                | 57                 | 89                 | 121                 | 171                 | 221                 |

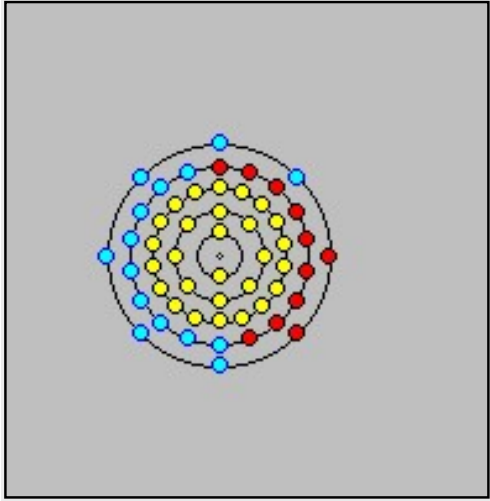
# Yttrium

## Truss Element

|   |                                       |
|---|---------------------------------------|
| Symbol  | Y                                     |
| Atomic Number   | 39                                    |
| Relative Atomic Mass<br>12C = 12.0000                         | 88.905 85 ( $\pm 2$ )<br>[Since 1985] |
| Atomic Radius pm  | 181                                   |
| First Ionisation Energy<br>kJ mol <sup>-1</sup>               | 616                                   |
| Ionisation Energy (eV)  | 6.2171                                |
| Electronegativity   | 1.22                                  |
| Density kg m <sup>-3</sup>                                    | 4469 [293 K]                          |
| Molar Volume cm <sup>3</sup>                                  | 19.89                                 |
| Thermal Conductivity<br>W m <sup>-1</sup> K <sup>-1</sup>     | 17.2 [300 K]                          |
| Melting Point K   | 1795                                  |
| Boiling Point K   | 3611                                  |
| Number of Isotopes  | 32                                    |
| Isotope Atomic mass/u Mole fraction                           | 89Y 88.905 8485(26) 1.0000            |
| Inner + outer Shells  | 3 + 2 =5                              |
| Inner + outer Orbitals  | 28 + 11 =39                           |
| Filling Orbital   | 4d <sup>1</sup>                       |
| Ground State Electron Configuration                           | [Kr] 4d <sup>1</sup> 5s <sup>2</sup>  |
| Ground State Electron Configuration with free Orbitals (n=15) |                                       |
|   | 0, 0, 0, 9, 6                         |

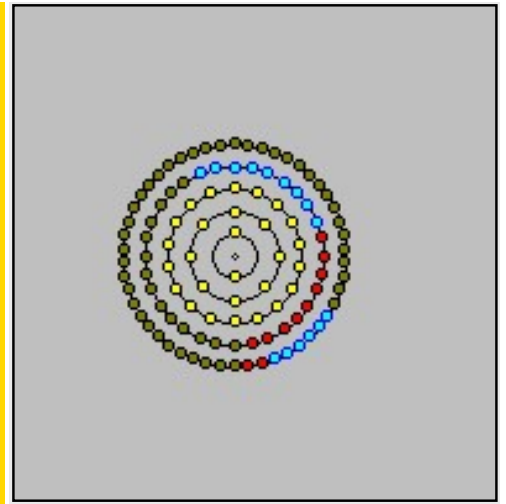


2, 8, 18, 9, 2



**Ground State Electron Configuration with compressed Orbitals (n=56)**

0, 0, 0, 14, 42



**Singularity**

110 = 28 + 11 + 15 + 56

|   | s | p | d  | f  | g  | h | i | j |
|---|---|---|----|----|----|---|---|---|
| 1 | 2 |   |    |    |    |   |   |   |
| 2 | 2 | 6 |    |    |    |   |   |   |
| 3 | 2 | 6 | 10 |    |    |   |   |   |
| 4 | 2 | 6 | 1  | 9  | 14 |   |   |   |
| 5 | 2 | 6 | 10 | 14 | 18 |   |   |   |
| 6 |   |   |    |    |    |   |   |   |
| 7 |   |   |    |    |    |   |   |   |
| 8 |   |   |    |    |    |   |   |   |

**Term Symbol**

$2 D_{3/2}$

**Discovery**

In 1794, the Finnish chemist **Johan Gadolin** (Åbo, Finland) discovered yttrium in the mineral ytterbite, which was later renamed gadolinite for Gadolin. Gadolin originally called the element ytterbium after ytterbite. The name was subsequently shortened to **yttrium**, and later another element was given the name **ytterbium**. The Swedish surgeon and chemist **Carl-Gustav Mosander** separated the element in 1843.

**Name Derived From**

The name derives from the Swedish village of Ytterby where the mineral gadolinite was found.

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