

# FERROMAGNETISM

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## DEFINITION

The magnetism in ferromagnetic materials is caused by the alignment patterns of constituents of constituent's atoms, which acts as elementary electromagnets.

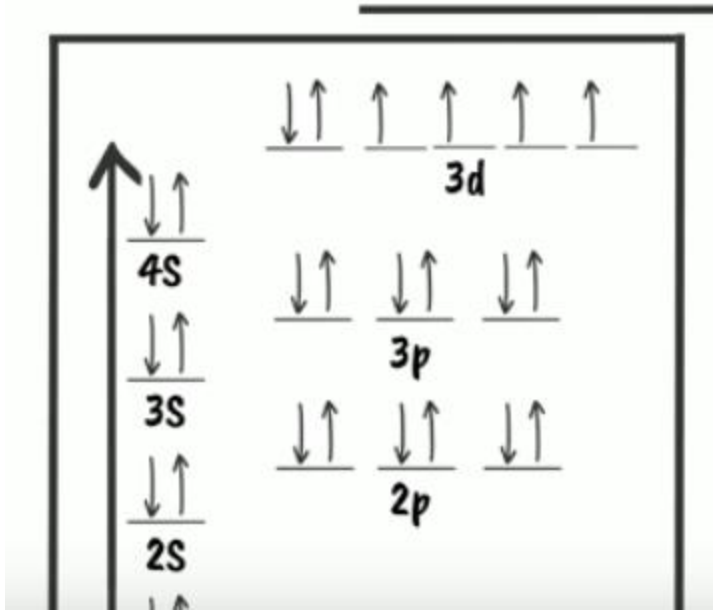
## EXPLANATION

Ferromagnetism is explained by the concept some species of atoms possess a magnetic moment, that is such an atom itself behaves as an electromagnet due to the spin motion of electrons. For example iron.

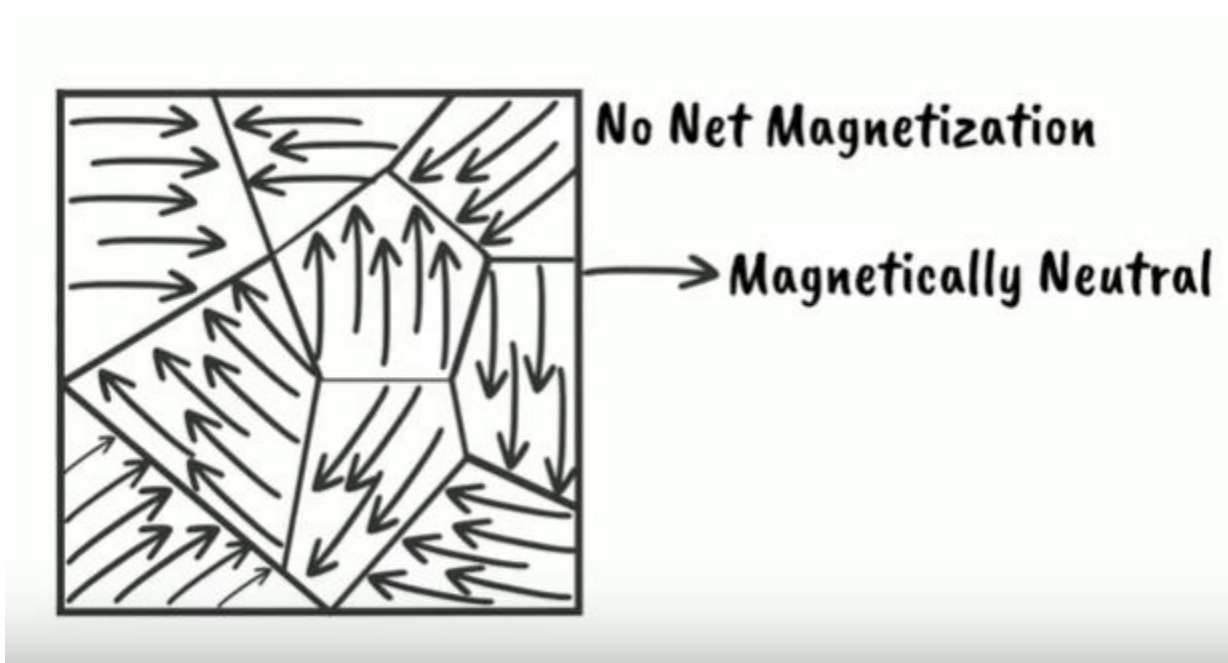
As we know that the magnetic behavior of materials is due to the spinning motion of electrons. The electrons can spin either in clockwise direction or in anticlockwise direction. In electron configuration upward arrow shows anticlockwise spin and downward arrow shows clockwise spin of electrons. Paired electrons do not show any magnetic behavior. Unpaired electrons show magnetic behaviours and that's why called magnetization electrons.

## FERROMAGNETISM IN IRON

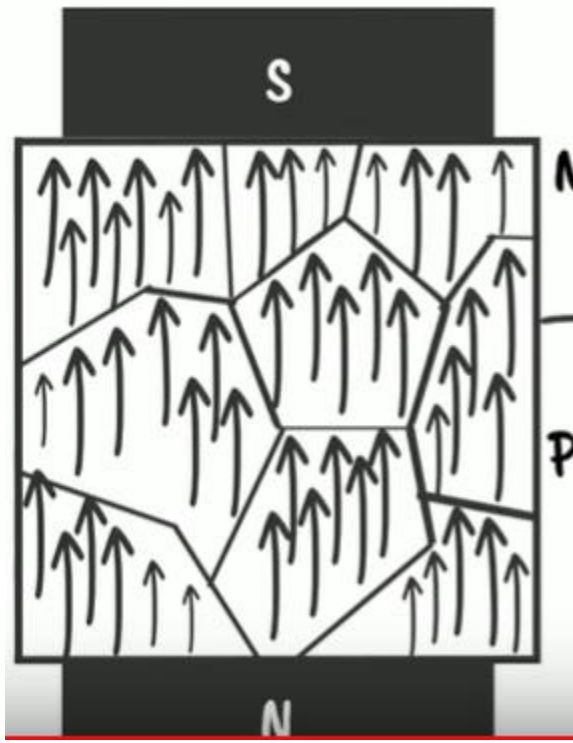
The electron configuration of iron atom is such that it contains 6 electrons in its outermost shell, in which 2 are paired and the other four are unpaired electrons. These four unpaired electrons are aligned in the same direction. so, iron atom acts as a magnetic dipole. Numbers of such magnetic dipole atoms aligned themselves in the same direction in a microscopic region called magnetic domains.



In the absence external magnetic field there is no net magnetization and all magnetic domains are randomly oriented.



In external magnetic field magnetic domain arranged themselves in the direction of applied magnetic field hence iron becomes magnetized.



When external magnetic field is removed, it remains magnetized up to some extent. This behavior of iron is called ferromagnetism.

Figure 1

