Brainbox learn easy

Unit 1

The Solid State

Magnetic properties of solids:

- Every substance some magnetic properties associated with it.
- This is because every electron in an atom behaves as tiny magnet.
- The magnitude of magnetic moment is measured in Bohr magneton (μ_B).

  1B.M = 9.27 x 10^{24} Am^2.

- Based on the magnetic properties, substances can be classified into five types.

  i) Paramagnetic

  ii) Diamagnetic

  iii) Ferromagnetic

  iv) Ferrimagnetic

Paramagnetic substances:

The substances are weakly attracted by magnetic field. They lose their magnetism in the absence of magnetic field. Paramagnetism in the absence of magnetic field. Paramagnetism may be may be due one or more no of unpaired electrons.

Ex. O_2, Cu^{+2}, Fe^{+2} etc.

Diamagnetic substances:

Substances that are weakly repelled by magnetic field diamagnetism is due to absence of unpaired electron.

Ex. H_2O, NaCl etc.

Ferromagnetic substances:

The substance that are strongly attracted by magnetic field.

- These substances can be permanently magnetized.

Ex. Fe, CO, Ni, CrO_2 etc.

Antiferromagnetic substances:

- The substances which possess more no of unpaired electrons but shows zero net magnetic moment. This is due to opposite orientation of equal no. of domains.

Ex. MnO

Ferromagnetic substances:

The substances which possess more no of unpaired electrons but shows very small net magnetic moment. This is due to opposite orientation of unequal no. of domain.

Ex. V_2O_3, NiO etc.

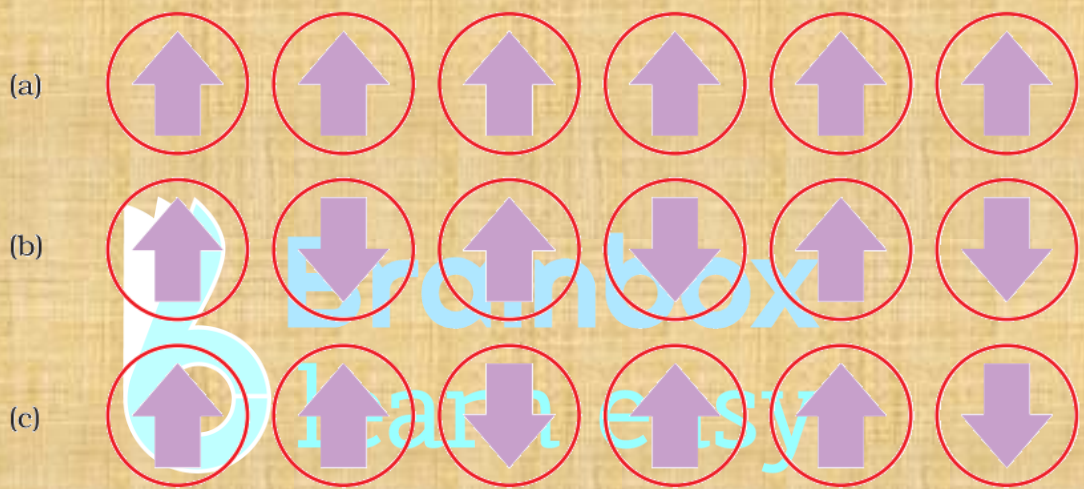

Fig. *Schematic alignment of magnetic moments in (a) ferromagnetic (b) antiferromagnetic and (c) ferrimagnetic.*