Al-Mustaqbal University

Department of medical physics

Second stage

Magnetism

Fourth Six

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What is magnetization?

Magnetization is the degree to which a body is magnetized once it is magnetized. Magnetization is the process by which an element acquires magnetic properties, through the application of a magnetic field. A magnetic field is an electrically charged area that possesses a force produced as a result of the traffic of electric charges. Once an element is magnetized, it acquires the force of attraction and repulsion on other objects with the same properties
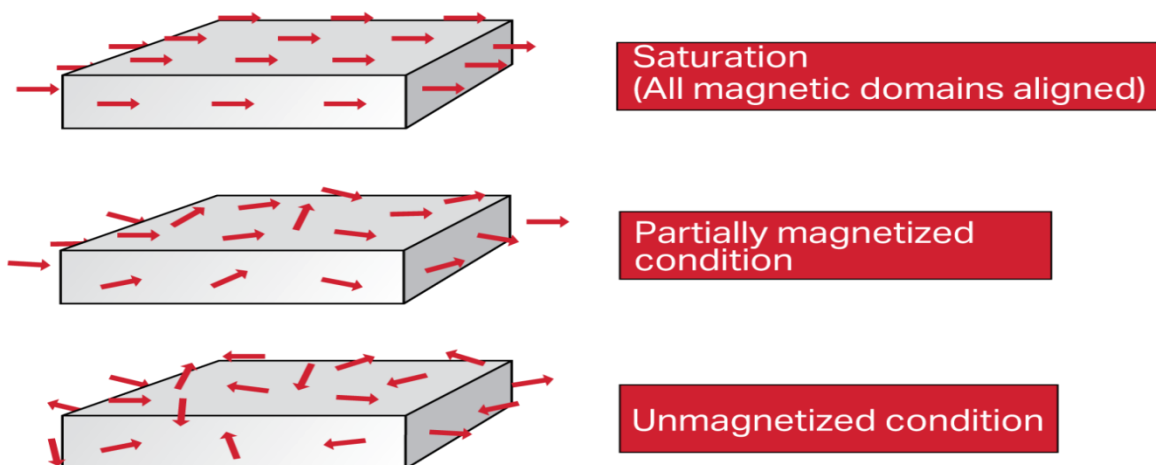
In classical electromagnetism, **magnetization** is the vector field that expresses the density of permanent or induced magnetic dipole moments in a magnetic material. Accordingly, physicists and engineers usually define magnetization as the quantity of magnetic moment per unit volume.[1] It is represented by a pseudovector **M**.

The magnetization field or **M**-field can be defined according to the following equation:

$$\mathbf{M} = \frac{dm}{dv}$$

Where **dm** is the elementary magnetic moment and **dv** is the volume element;.

Magnetization

Saturation
(All magnetic domains aligned)

Partially magnetized condition

Unmagnetized condition

What is Magnetic field intensity?

Magnetic field intensity is defined as the degree to which the magnetising field can magnetise a material. The magnetic field which magnetises a material placed in it is known as the **magnetising field**. Magnetic field intensity is denoted by '**H**' and also known as **intensity of magnetising field** or **magnetising force**.

Magnetic field intensity (H) is equal to the ratio of the magnetic flux density (B) to the permeability of the material. The SI unit of magnetic field intensity is **Am^{-1}**.

$$H = \frac{B}{\mu}$$

Where

$$\mu = \mu_o \mu_r$$

μ_o is known as absolute permeability of vacuum or free space and $\mu_o = 4\pi \times 10^{-7}$ TmA^{-1}