Magnetization refers to the magnetic moment per unit volume of a material. In the context of MRI (Magnetic Resonance Imaging), magnetization refers to the alignment of atomic nuclei with an external magnetic field.

When a sample is placed in a magnetic field, the nuclei with a non-zero nuclear spin, such as hydrogen nuclei (protons), align with the direction of the magnetic field. This alignment results in a net magnetization of the sample.

In MRI, radiofrequency (RF) pulses are used to manipulate this magnetization. When an RF pulse is applied at the resonant frequency of the nuclei, it can cause a transfer of energy to or from the spins, leading to changes in the orientation of the magnetization. This manipulation of magnetization is crucial for generating the signals used to create images in MRI.

Magnetization plays a central role in various MRI techniques, including Magnetization Transfer Imaging (MTI), which involves the exchange of magnetization between different pools of protons in tissues, and Magnetization Prepared Rapid Gradient Echo (MP-RAGE), which uses a preparation pulse to enhance image contrast. Understanding the behavior of magnetization is fundamental to the principles and applications of MRI.