

Compare, distinguish and explain what is the difference between Hard and Soft Magnetic Material. Comparison and Differences.

## **Difference between Hard and Soft Magnetic Material**

1. Hard magnetic material have large hysteresis loss. Soft magnetic material have low hysteresis loss.
2. Domain wall moment is difficult in hard magnet whereas domain wall moment is relatively easier in soft magnet.
3. In the first, coercivity & Retentivity are large. In the second, coercivity & Retentivity are small.
4. Hard magnetic material cannot be easily magnetized & demagnetized. Soft magnetic material can be easily magnetized & demagnetized.
5. Magnetostatic energy is large in the first. Magnetostatic energy is small in the soft magnet.
6. Hard magnets have small values of permeability and susceptibility Soft magnets have large values of susceptibility and permeability.
7. First one can be used to make permanent magnets. Second one can be used to make electromagnets.
8. Hard magnetic material examples: Iron-nickel-aluminum alloys, copper-nickel-iron alloys, copper-nickel-cobalt alloys. Soft magnetic material examples: Iron- silicon alloys, ferrous- nickel alloys, ferrites, garnets.