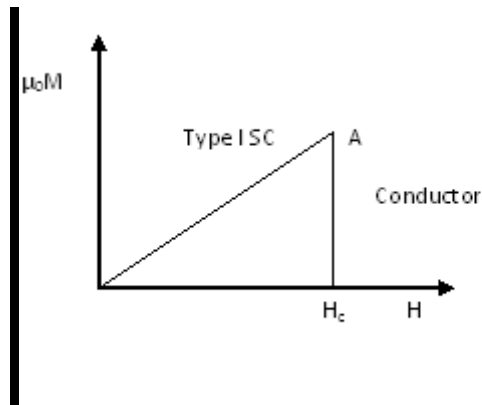




### Type I or Soft superconductors:

Type I superconductors are those superconductors that lose their superconductivity very easily or abruptly when placed in the external magnetic field. As you can see from the graph of the intensity of magnetization ( $M$ ) versus applied magnetic field ( $H$ ), when the Type I superconductor is placed in the magnetic field, it suddenly or easily loses its superconductivity at the critical magnetic field ( $H_c$ ) (point A).



Type I Superconductors

After  $H_c$ , the Type I superconductor will become a conductor.

b) Type I superconductors are also known as **soft superconductors** because of this reason that is they lose their superconductivity easily.

c) Type I superconductors perfectly obey the Meissner effect.

d) Example of Type I superconductors: Aluminum ( $H_c = 0.0105$  Tesla), Zinc ( $H_c = 0.0054$ )

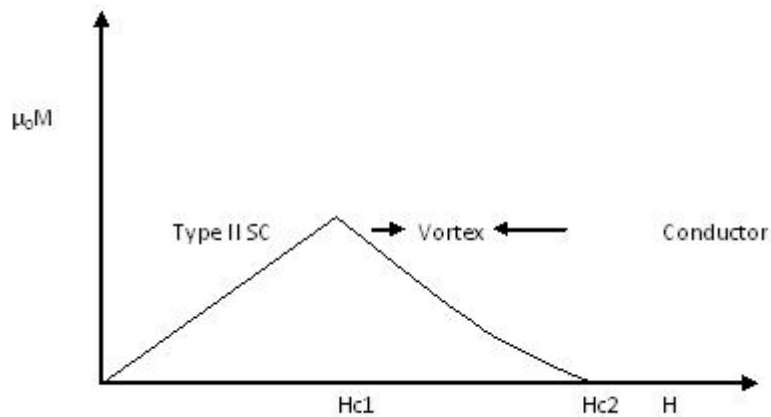
### 2) Type II or Hard superconductors:

The following is the definition and Properties of Type II or Hard Superconductors:

a). Type II superconductors are those superconductors that lose their superconductivity gradually but not easily or abruptly when placed in the external magnetic field. As you can see from the graph of the intensity of magnetization ( $M$ ) versus applied magnetic field ( $H$ ), when the Type II superconductor is placed in the magnetic field, it gradually loses its



superconductivity. Type II superconductors start to lose their superconductivity at the lower critical magnetic field ( $H_{c1}$ ) and completely lose their superconductivity at the upper critical magnetic field ( $H_{c2}$ ).



type II Superconductors

b) The state between the lower critical magnetic field ( $H_{c1}$ ) and upper critical magnetic field ( $H_{c2}$ ) is known as **vortex state or intermediate state**.

After  $H_{c2}$ , the Type II superconductor will become a conductor.

c) Type II superconductors are also known as **hard superconductors** because of this reason that is they lose their superconductivity gradually but not easily.

d) Type II superconductors obey the Meissner effect but not completely.

e) Example of Type II superconductors: NbN ( $H_c = 8 \times 10^6$  Tesla),  $BaBi_3$  ( $H_c = 59 \times 10^3$  Tesla)

f) Application of Type II superconductors: Type II superconductors are used for strong field superconducting magnets.