

# Super conductivity for materials

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Superconductors, which are at high temperatures, are defined as a type of material that has a behavior similar to that of superconductors, which is at a temperature above 200 ° C, and this temperature is considered the lowest temperature that liquid nitrogen can reach because it is One of the simplest coolants available in the field of supercooling

The properties of superconductors appear only under the influence of atmospheric pressure and at temperatures well below ocean temperature. Ceramic conductors are nowadays suitable for practical uses as they work at high temperatures, despite the presence of several problems in the process of their manufacture, because most ceramic materials are classified as brittle materials, and this makes the process of manufacturing wires from them a difficult process. With a great advantage, it can be cooled using liquid nitrogen. As for metallic superconductors, their cooling requires the use of cool materials that are difficult to obtain, such as liquid helium, knowing that until now no superconducting materials have been obtained that can be cooled using dry ice to the required extent only a second Carbon dioxide in its solid state

There are three important factors by which the properties of superconductivity can be known, as follows :

- 1- critical temperature
- 2- critical density of current
- 3-  $H_c$  critical magnetic field

The first property includes the critical temperature, which means that it is the temperature at which a transition process takes place from the normal state to the superconductivity state, and it varies from one material to another, and it decreases with the increase in the density of the applied current. The second property ( $I_c$ ) can be defined as the maximum current that passes in a sample while maintaining the state of superconductivity

Several classes of conductors at high temperature can be compared, which are :

1The main class of conductors, which are classified into the copper oxides category

2The second category of conductors, which are practically classified as ferrous compounds

3The third category, in which magnesium boride is graded into superconductors, where the process of manufacturing magnesium boride is an easy process and its effect appears at a temperature of less than 230 degrees Celsius, and this explains the use of liquid helium instead of liquid nitrogen in the process of cooling it