Superconductor type 1 and 2

Type 1 and type 2 superconductors examples. Differentiate between type 1 and type 2 superconductor. Difference between type 1 and type 2 superconductor. What is type 1 superconductor. Explain type 1 and type 2 superconductors. Type 1 vs type 2 superconductors.

Superconductors can be classified based on various criteria including physical properties and cooling costs. **Type I Superconductors**: Have a single critical field (Hc) and undergo an abrupt transition between superconducting and normal states when it is reached. **Type II Superconductors**: Possess two critical fields, Hc1 and Hc2, where they are perfect superconductors below the lower critical field and return to normal conductance above the upper critical field. Including heavy fermion superconductors which cannot be explained using BCS theory or related theories. These materials have unique properties that defy conventional understanding and require further research to fully comprehend their behavior. Superconductors are categorized into three main groups based on their critical temperatures: low-temperature superconductors (LTS) below 77K, high-temperature superconductors (HTS) above 77K, and room-temperature superconductors. The demarcation point of 77K is significant as liquid nitrogen can be used to achieve superconductivity in materials at this temperature. Most pure element-based superconductors are Type I, but some exceptions exist such as niobium, technetium, and certain carbon allotropes. Alloys like Niobium-titanium exhibit superconducting properties. Ceramics, including Cuprates and YBCO family, also display high-temperature superconductivity. Other materials like Nickelates and Ruddlesden-Popper phase analogs have been found to be superconducting at lower temperatures. The classification of superconductors is not exhaustive and ongoing research continues to discover new materials with unique properties. Iron-based superconductors, magnesium diboride, palladates, and other compounds are being studied for their potential to exhibit superconductivity. The discovery of superconductors, such as Hg3NbF6 and Hg3TaF6, has led to significant advancements in the field of materials science. These compounds exhibit superconductivity below 7 K (-266.15 °C; -447.07 °F), making them valuable for various technological applications. Recent breakthroughs have led to the development of new superconductors, including infinite-layer nickelates and quintuple-layer square-planar nickelates, which demonstrate superconductivity at temperatures above absolute zero. Furthermore, scientists have made significant progress in understanding the mechanisms underlying superconductivity. For instance, the discovery of magnesium diboride (MgB2) has led to a deeper comprehension of the properties required for high-temperature superconductors. As researchers continue to explore the frontiers of superconductor materials, they are uncovering new possibilities for their application in cutting-edge technologies.