

Highlights

ACTIVITY B [Superconducting and correlated low dimensional materials and devices for quantum electronics and spintronicst](#) - 2020

A Perspective on Conventional High-Temperature Superconductors at High Pressure: Methods and Materials

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An international collaboration involving researchers from Italy, Germany and Japan has published one of the most complete reviews on the field of high-temperature superconductivity at high pressures.

The field of superconductivity has been galvanized by reports of critical temperatures of 203 K (2015) and 260 K (2019) in two hydrogen-based materials. These two reports have broken the previous records held by the cuprates, providing the first glimpse to the solution of the hundred-year-old problem of room-temperature superconductivity.

In the Review, published open access on Physics Reports, explain the mechanism underlying superconductivity in these exceptional compounds and provide a complete reference of the recent advances in experimental techniques, superconductivity theory and first-principles computational methods which have made these discoveries possible. Besides, in an attempt to evidence empirical rules governing superconductivity in hydrides under pressure, the authors also discuss general trends in the electronic structure and chemical bonding, possible strategies to optimize pressure and transition temperatures in conventional superconducting materials as well as future directions in theoretical, computational and experimental research.

In the words of the Referees, this work has been classified as "*one of the most complete, and up-to-date Review on the superconductivity of Hydrides, that will definitely serve as a reference for future works.*"

