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Development of Superconducting MgB2 Wires

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The Magnesium Diboride (MgB₂), is a material known since early 1950's, but, whose superconducting (SC) properties were defined in 2001, positioning this as a High-Temperature superconductor material ($T_c = 39-40$ K). The absence of weak-link and the simple crystalline structure allows to produce wires using the powder in tube (PIT) technique, allowing the industrial development and application. Currently, the MgB₂ wire technology is making a significant progress, due to the continuing research and industrial development. Nowadays, the MgB₂ is a good candidate to replace NbTi in liquid helium-free magnetic resonance imaging (MRI) magnet. In addition, the MgB₂ is used in rotating electrical machines, wave-energy converters and in high current cables for powering devices. Columbus MgB₂ wire unit (ASG Superconductors Spa), is working into improve the uses and performance of the MgB₂ and MgB₂ wires production, using a technology, which allows to produces MgB₂ multi-filamentary wires with unit length exceeding 2-4km in a single piece. In order to obtain and qualify a high performance Mgb2 wire, in Columbus, it is carrying out the characterization of MgB₂ wires, through SEM, mechanical Test, critical current analysis, critical temperature and residual-resistance ratio (RRR) Test.

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