

HTS Applications

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Abstract

Nowadays, superconductivity has found many attractive applications in medicine, science, power systems, engineering, transport and electronics. There is no doubt, that the most prominent applications of superconductivity are superconducting magnets. Most of the magnet applications like e.g. MRI magnets, NMR magnets, Accelerator magnets and magnets for Fusion still use low temperature superconductors.

Since the discovery of high temperature superconductivity (HTS) in 1986 there has been a tremendous progress in R&D of HTS material, wires and applications. Especially for power system applications HTS offers considerable economic benefits. Many HTS demonstrator or prototype applications have been build and successfully tested and some HTS applications like cables and superconducting fault current limiters seem very close to commercialization.

This paper gives an overview about the different HTS applications with the main focus on present and future HTS magnet applications (High field magnets, Fusion magnets, Current leads) and power system applications (Cables and fault current limiters). The present state-of-the-art is given and future developments and R&D work is summarized. Main results of the Forschungszentrum's Karlsruhe program to develop HTS technology for magnet applications are presented. Due to the fast progress of coated conductor development in recent years and the promising cost perspectives this material is a good candidate for present and future HTS applications.