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Can high-temperature superconductor cable be used in space solar power stations?
Abstract: Compared to traditional metal cable,high-temperature superconductor (HTS) cable is a promising candidatefor the energy transmission in space solar power stations due to its great advantage in high power density and efficiency.

What is high temperature superconductor (HTS) REBCO?
There is growing confidence in high temperature superconductor (HTS) REBa 2 Cu 3 O 7-x (REBCO; RE = rare earth) applications based on coated conductors (CCs). These include fusion magnets,magnetic levitation trains,motors,transformers,power transmission,current leads,superconducting magnetic energy storage.

Why are high temperature superconductors important?
Thus,they can reduce energy consumptionand can be an enabling technology in applications that require light-weight machines. Using high temperature superconducting (HTS) materials in machines simplifies cooling designs compared to using low temperature superconductors.

What is a high-temperature superconductor (HTS)?
A revolution in superconductivity had begun and attention shifted to the new high-temperature superconductor (HTS) materials 13, 14, 15, 16, 17, 18. HTSs can have more than 200 times higher current carrying capability than LTSs at 4.2 K in self-field 19, 20 and more than 60 times higher than copper at 77 K in self-field 21, 22.

Can high-temperature superconductors be used in large-scale applications?
Developments in HTS manufacture have the potential to overcome these barriers. In this Review,we set out the problems,describe the potential of the technology and offer (some) solutions. High-temperature superconductors are now used mostly in large-scale applications,such as magnets and scientific apparatus.

Are superconductors high-temperature?
They are "high-temperature" only relative to previously known superconductors,which function only closer to absolute zero.

Besides the material properties relevant for applications, the deposition of superconductor films and the manufacture of high-temperature superconductor ...

Abstract High-temperature superconducting (HTS) bulks can not only be self-stable when levitated above a permanent magnet (PM) but also can be used as quasi PM with higher ...

1. Introduction Currently, YBa 2 Cu 3 O 7-x-coated conductors (YBCO CCs) are considered some of the most promising superconductors for many applications [1], [2] because of ...

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In a superconducting electrodynamic suspension train, a high temperature superconducting (HTS) magnet gradually accelerates to levitation speed under the action of the ...

The discovery of novel high-temperature superconductor materials holds transformative potential for a wide array of technological applications. However, the combinatorially ...

The aim of this paper is to present feasibility of application of High Temperature Superconducting (HTS) cables for Space-Based Solar Power (SBSP) app...

High-temperature superconducting magnetic energy storage systems (HTS SMES) are an emerging technology with fast response and large power capacities which can address the ...

In this paper, a high-temperature superconducting energy conversion and storage system with large capacity is proposed, which is capable of realizing efficiently storing and releasing ...

Abstract Potential performance advantages of a solid nitrogen cooled "permanent" high-temperature superconducting (SN2/HTS) magnet system over a liquid helium cooled low ...

Results from tests using a SMB subjected to a levitation time of 3,000 hours, 120 current value increase and decrease cycles and 24 heat cycles verified the reliability of the SMB. Keywords: flywheel energy ...

Introduction of 22.Verification of High Temperature Superconducting Flywheel Storage Systems of the Railway Technical Research Institute.

This paper has presented an analysis of the design and feasibility of employing High Temperature Superconducting (HTS) cables for Space Solar Power Satellite (SBSP) applications.

OverviewPropertiesHistoryProductionOngoing researchTheoretical modelsSee alsoExternal linksThe "high-temperature" superconductor class has had many definitions. The label high-Tc should be reserved for materials with critical temperatures greater than the boiling point of liquid nitrogen. However, a number of materials - including the original discovery and recently discovered pnictide superconductors - have critical temperatures below 77 K (-196.2 °C) but nonetheless are commonly referred to in p...

High Temperature Superconducting (HTS) Magnetic Energy Storage (SMES) devices are promising high-power storage devices, although their widespread use is limited by their high ...

This study carried out a comparative analysis using low-frequency torsional vibration and resonant vibrating reed spectroscopy methods. The results showed a possibility for the existence ...

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This approach aims to stabilize power supply by leveraging the unique properties of superconductors. In the current research, the influence of temperature and substrate materials on the ...

High-temperature superconducting material-based inductive coils combine superconductivity concepts with magnetic energy storage to store electrical power. High temperature ...

Further applications of a functional MRI system and dynamic contrast enhanced (DCE) MRI are under investigation to test the applicability of this high-temperature superconducting coil system in a 3T ...

The proposed system is based on the interesting interaction between multiple high temperature superconducting coils and the permanent magnet. The working principle and performance of the ...

Low-temperature superconductors (LTSs) require either cryocoolers or costly, and increasingly rare, liquid helium -- whereas high-temperature superconductors (HTSs), although still needing ...

Cryogenics for high temperature superconductors (HTS) does not always mean operation at the temperature of liquid nitrogen or near its critical temperature. For any application, the ...

Since high temperature superconducting magnetic energy storage system (HT SMES) has attracted significant attention for their fast response in milliseconds, high efficiency (cyclic ...

A room-temperature superconductor would completely change electronics and now we finally understand what makes high-temperature superconductors work at these elevated temperatures.

Addressing the operating conditions of vacuum and cryogenic temperatures for space satellites and the performance indicators required by research projects, this study introduces the ...

Superconducting rotating machines are more efficient, smaller and lighter than conventional ones. Thus, they can reduce energy consumption and can be an enabling technology in ...

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