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Sun-Mo-PL1-04: Magnetic levitation systems with HTS 2G tapes: the newest developments and future perspectives

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The use of high temperature superconductors (HTS) in magnetic levitation (Maglev) has been investigated for decades. Superconducting materials may be used in both the propulsion and levitation subsystems of a device. For the propulsion subsystem, their use in electric machinery potentially reduces losses and increases the power to volume or mass ratio. For the levitation subsystems, they are part of passive magnetic bearings, with both linear and rotational movement, depending on the application. One of the most successful areas of application is transportation. Several magnetic levitation vehicles have been built and fully implemented, sometimes to full scale. The preferred material of choice for these systems were HTS bulks. In the last decade, however, there has been an increased interest in HTS second generation (2G) tapes for many applications of superconductors, such as electric machinery, cables, fault current limiters, and, of course, Maglev systems. These tapes are regarded as being more uniform and of having better thermal and mechanical characteristics than bulks while also showing higher force to volume ratio when applied to levitation. In this work, the use of HTS 2G tapes in magnetic levitation, especially to those applied to transportation systems, is discussed. Advantages and disadvantages of this application, as well as the current trends and future perspectives, are presented and examined.

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