

A New Generation High-Temperature Superconducting Maglev Vehicle Developed in Chengdu, China

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Abstract: In order to further develop the manned potential and curving performance of the high-temperature superconducting (HTS) Maglev vehicle and verify the carrying capability of the system, a new HTS Maglev vehicle named "KENYON" has been successfully developed at Southwest Jiaotong University (SWJTU) in December 2019. The maglev vehicle (2.9 m in length, 1.1 m in width) with a levitation height of 10 mm was designed for 8 seated passengers which is run on a 45-m-long racetrack-type evacuated tube (Ring Line) with a 2-m-diameter circular cross section. Compared with the previous maglev vehicle "Super-Maglev", the "KENYON" vehicle decreases dead weight by 30% and increases the propulsion and braking forces by 75%. Meanwhile, the amount of HTS bulks used in this vehicle is the same as that of the previous generation. By the efficient usage of the limited space, it has the design characteristics of 56% low floor area of the whole vehicle which is convenient for the whole 8 passengers seating, getting on and getting off. Moreover, the curve passing performance of the vehicle on the Ring Line has been specially improved by adjusting running mechanism. The experimental results of dynamic performance show that the vehicle has a good riding comfort and small radius curve negotiation. The system component and test data are reported in detail in this paper. The progress strongly demonstrates the HTS maglev has the potential of load capacity and curving performance for practical application.

Keywords: Bulk high-temperature superconductors, HTS Maglev, Prototype vehicle, Test line, Dynamic running.