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## Simulation of the delamination behaviors in the 2G HTS tape with consideration of thermal stress

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Key Laboratory of Mechanics on Environment and Disaster in Western China, The Ministry of Education of China, Lanzhou The 2G HTS tapes have been widely used in the magnets, cables and superconducting magnetic energy storage (SMES) systems with its outstanding electromagnetic characteristics. As a typical multi-layer composite structure, the superconducting tape is delaminated easily by the strong electromagnetic force and the thermal stress. A numerical model of the peel test is built to research the effect of thermal stress on the peel strength by inserting a mixed-mode traction-separation law near the superconducting layer. The model can be implemented to simulate all mode type (mode I, mode II and mode III) fractures and to prevent recover once the occurrence of the delamination. The plastic properties of the constituent materials and the dependence of the peeling angle are taken into account in this model. The thermal stress-strain state is analyzed firstly after cool down from room temperature to operating temperature (77 K or 4.2 K). Then the numerical simulation of the peel test procedure is presented to get the peel strength. Finally, the effect of the thermal stress on the peel strength is analyzed. This study should be useful to the promotion of the manufacture technology of the 2G HTS tape.

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