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2G HTS Magnet Stability Improvement via V2O3 Material and perforated HTS Wire

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In this paper, we propose an improved wire structure that easily causes current bypass when the V2O3 material is applied turn-to-turn in 2G HTS no-insulation coils. A characteristic of the V2O3 material is that when a quench causes the coil temperature to rise the turn-to-turn resistance is lowered and current is bypassed. However, due to the high material resistance of the original 2G HTS wire, the turn-to-turn resistance is large and the resulting amount of bypassed current is small. Therefore, in order to reduce the turn-to-turn resistance of the original 2G HTS coil, a short sample test and a FEM analysis were performed of the perforated wire. We also applied the proposed method to the coil and verified its validity through experimental results.

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