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Quench Protection Test Results of an HTS Model Magnet for MRI Systems Equipped with Electrically Conductive Epoxy Resin

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We fabricated a conduction-cooled 3 T REBCO MRI magnet equipped with electrically conductive epoxy resin. The magnet is composed of 100 single pancakes and the total inductance is 91 H. When the operating current is 145 A, the central magnetic field is 3 T and the stored energy is 1 MJ. A quench protection test was carried out by raising the coil temperature using the heater. After the coil voltage exceeded 1 V, the supply current was interrupted. The stored energy of 1 MJ was dissipated by electrically conductive epoxy resin and the external protective resistor. Although the coil temperature increased from 45 K to 77 K, the thermal runaway was avoided successfully.

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