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Development of liquid nitrogen cooled RE-Ba-Cu-O magnet for NMR use

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We have developed RE-Ba-Cu-O (REBCO; RE=rare earth) superconducting magnet operated in subcooled liquid nitrogen (68 K). The superconducting magnet is a stack of six double pancake (DP) coils. Each DP coil was made of a REBCO coated conductor. The conductor was insulated by polyimide tape wrappings. The width and thickness of the insulated conductor were 4 mm and 0.2 mm, respectively. The outer diameter, inner diameter, and height of the coil stack are 107 mm, 57 mm, and 68 mm, respectively. The number of turns was 770. Ferromagnetic SS400 flanges were used on both ends of the magnet to improve performance, because they changed the field profile to reduce radial component of the magnetic field, which corresponds to perpendicular component for conductor. The magnet generated 1.6 T at 67 K for 1 hour stably. It generated 2.1 T at 66 K for 1 minute. Temperature dependence of the coil performance, the effect of ferromagnetic flanges, and applicability for NMR will be discussed.
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