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Development of the 1 MW Superconducting Induction Heater

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The 1 MW HTS induction heater has been developed for the non-ferrous metal industry where the HTS coil is used to generate a static magnetic field. The HTS magnet is made of YBCO conductor produced by Shanghai Superconductor, and the prospected operating temperature is about 25 K. The size of Aluminium billet was set to 446 mm of the diameter and 1500 mm of length, and the heating power of was determined to be 1000 kW with over 80% of system efficiency. The conduction-cooled HTS magnet consists of three solenoid coils wound with 18 km YBCO conductor. The inner and outer diameters of the YBCO magnet are $\Phi 1960$ mm and $\Phi 2009$ mm, respectively. The magnet system is cooled by two AL325 cryo-refrigerators. According to the testing results at an operation current of 130 A, the temperature of the HTS coils and the thermal shield are less than 20 K and 70 K, respectively, while are much better than the expected value.



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