



Contribution ID: 337

Type: **Poster Presentation of 1h45m**

Design and Performance Study of a 1 MW Induction Heater with HTS DC magnet

Thursday 31 August 2017 13:45 (1h 45m)

The high temperature superconductor (HTS) direct current (DC) induction heater shows a great potential in improving the efficiency and heating quality, which has been studied and validated in some laboratory-scale prototypes. Now, an industrial scale HTS DC induction heater with 1 MW is designed and manufactured in Shanghai Jiao Tong University, China. The heater is designed for aluminum billets with a diameter of 466 mm and length of 800~1500 mm. Two cryocoolers are applied for coil cooling with pluggable sleeve and providing an additional safety margin whose operating temperature is designed to be 25 K. The magnet consists of a large solenoidal coil wound by YBCO tapes from Shanghai Superconductor Technology Company (SSTC), China. More than 18 km HTS tapes are used and the inductance of coil with iron is 98 H. The critical current of the magnet is 213 A and its operating current is set to be 170 A. The magnet is designed to generate approximately 0.7 T DC magnetic fields in its air gap. In the tests, the aluminum billets of 337~632 kg are heated from ambient temperature to 500 °C with 240~720 rpm. The temperature distributions of the aluminum billets are optimized by rotation speed and the distribution of the dc magnetic field in the air gap. The test results show a good agreement with the designed targets. The total efficiency of this industrial scale HTS DC induction heater is about 80 %, which shows a great commercial potentials.

Submitters Country

China

Primary author: YANG, Ping (Shanghai Jiao Tong University)

Co-author: QIU, Derong (Shanghai Jiao Tong University)

Presenter: YANG, Ping (Shanghai Jiao Tong University)

Session Classification: Thu-Af-Po4.07

Track Classification: E9 - Novel and Other Applications