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Thu-Af-Or21-03: Practical Design and Performance Analysis Results of the First MgB₂ Magnets for Superconducting Induction Heater in Korea

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A superconducting induction heater has been developed and commercialized as a high efficient preheater for the Aluminum, aluminum brass and stainless steel extrusion in Korea. Also, Supercoil had a first step for the commercialization of the SIH using MgB₂ magnets in Korea. He created the 'MAGHEET' as the brand name of the induction heater using magnets such as HTS (high temperature superconducting) and MgB₂ and permanent magnets and etc.

Conventional induction heaters with a large capacity to preheat the metal billets for the extrusion product such as copper, titanium and stainless steel have low energy efficiency below 60% due to the considerable loss from the copper coils. The MAGHEET is one of the efforts to improve their efficiency in industries.

Supercoil has developed two types of superconducting magnets for large scale SIH. One is HTS magnets. The other is MgB₂ magnets. In this paper, we are going to introduce design specifications and performance analysis results of two types of the superconducting magnets under the same conduction cooling condition. The cooling time, excitation, magnetic flux density, thermal stability and quench characteristics of two superconducting magnets at the near 10 K were presented and compared.

The successful heating test results will be shown in the conference. The first commercial MAGHEET will be on a sale and introduced, too.

Primary authors: CHOI, Jongho (Supercoil Co., Ltd.); Mr LEE, Chan-Kyeong (Supercoil Co., Ltd.); Mr CHO, Sangho (Supercoil Co., Ltd.); PARK, Minwon (Changwon National University); Prof. MASATAKA, Iwakuma

Presenters: CHOI, Jongho (Supercoil Co., Ltd.); Mr LEE, Chan-Kyeong (Supercoil Co., Ltd.)

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