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Development of Test Device for Aluminum Metal Melting by Electromagnetic Induction Heating Using HTS Coils

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The development and of magnetic billet heating with high temperature superconductor (HTS) coils provided energy benefits to the aluminum extrusion process, compared with conventional technologies. The magnetic billet heating technique by rotating aluminum rods in a magnetic field achieved large heating capacity with high efficiency in short time for an extrusion. Recently, in an industrial aluminum casting technology such as production of automotive parts, high efficient and high speed melting technology is required. Aluminum metal melting by induction heating using HTS coils is one of candidates. In our former study, we have verified the capability of induction heating using DC superconductor coils for aluminum metal melting in the casting process. In this study, the test device for aluminum metal melting by the induction heating using HTS coils was designed using the numerical electromagnetic and thermal analysis. Based on the numerical result, the 1/5 scale test device using REBCO HTS coils was designed and fabricated. In the presentation, the design and fabrication process of the test device, and the results of the preliminary experiment using the rest device are reported.

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