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## **Wed-Af-Po3.25-07 [111]: The rapid heating and quenching method for MgB<sub>2</sub> superconducting wires with kilometer-grade length**

*Wednesday 25 September 2019 14:00 (2 hours)*

In order to reduce the long-term annealing process and prevent excessive grain growth, we attempted to fabricate MgB<sub>2</sub> superconducting wires by the rapid heating and quenching (RHQ) method. We have successfully synthesized kilometer-length 6+1 filamentary MgB<sub>2</sub> wires reinforced and toughened by Nb/Cu composite with in-situ powder-in-tube method, and for the first time applied the rapidly heating and quenching (RHQ) to the treatment of MgB<sub>2</sub> wires, directly realizing the superconductivity of quenched MgB<sub>2</sub> wires as well as the improvement of workability, thus avoiding the necessary annealing program in the conventional process. The results show that the phase composition of samples is mostly MgB<sub>2</sub> after treatment with heating current at 350A, except for a small amount of impurities. Most importantly, at 5T and 20K, the critical current density is still as high as  $1.34 \times 10^3 \text{ A cm}^{-2}$ , which fully meets the requirements of practical applications.

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