Superconducting joints made with internal-magnesium-diffusion-processed MgB2 wires

A. Matsumoto and H. Kumakura
National Institute for Materials Science (NIMS), Tsukuba, Japan

- Conventional MRI magnets: Nb-Ti & Nb3Sn Superconducting (SC) magnets
- Recent remarkable progress MgB2 superconductor:
  1) higher $J_c$, $J_e$, 2) long length wire.
- This work: Superconducting joint made:
  1) easy fabrication process, 2) Microstructures and properties

**Background**

**IMD-MgB2 wire and Joint fabrication**

**1) Microstructures and $I_c$ properties**

**2) Joint resistance**

**Summary**

- IMD-MgB2 superconducting joint was made successful.
- 1) $I_c$ value of joint part was over 10 A@8T, 4.2K, @4.5T, 15K.
- 2) Joint resistance = $10^{-13}$ Ω @15K.
- This joint technique is very easy and have a good potential by optimization in the future.

**Acknowledgement**

A part of this work was partly supported by JST ALCA.
Authors would like to appreciate Dr. Ichiki and Dr. Tanaka of Hitachi Co. Ltd. for their help in our experiments.