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Wed-Af-Po3.25-11 [114]: Influence of chemical treatment of the raw precursors for the MgB₂ superconducting applications

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For the high performance of the wires, cables, and further to the various magnet applications of MgB₂ superconducting materials, the important issues have been addressed on the raw precursors of their purity, relative sizes, crystallinity, and the surface conditions including MgO and B₂O₃ impurities. Since in situ MgB₂ superconducting wires have been fabricated using the reaction of Mg and B precursors, which were contaminated inevitably from the exposure to air during the fabrication process.

In this work, B₂O₃ impurities can be thoroughly removed and oxygen contents are much reduced through the chemical treatment conducted at room temperature, which is more effective compared to the thermal reduction process at higher temperature of 950°C for 48 hours. It was found that T_c values are even increased and high-field J_c at both 5 & 20 K were all enhanced with the common solvents like ethanol, methanol, acetone, and even water. In addition, it is worth mentioning that the J_c at low-fields are also enhanced when the boron precursor are treated chemically with the solvents of ethanol and acetone than that of pure MgB₂

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