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M3Or3H-02: [Invited] The critical current and critical current density of MgB₂ ultrafine superconducting wires and cables

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We are ongoing R&D of ultra-fine MgB₂ superconducting wires having a very small diameter much less than a human hair. These ultra-fine MgB₂ wires could be bundled and fabricated easily into stranded cables for increasing the current capacity. In principle, the bending strain decreases with decreasing the wire diameter as well as the hysteresis loss. The stranded cables made by these ultra-fine MgB₂ wires would have very flexible mechanical performance and thus react and wind techniques would be applicable. In addition, the coupling loss for the stranded cables is expected to be minimized by increasing the surface and contact resistance, which are relatively easy to be controlled. Therefore, it may be solved both the issues of mechanical brittleness and AC losses at once. The critical current density should be maintained to be comparable or more with commercial MgB₂ monolith wires even through ultrafine wires and cables. The critical current and critical current density at 4.2 K of MgB₂ ultrafine superconducting wires and cables will be presented.

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