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Basic development studies for mineral insulated superconducting magnet using REBCO coated conductors.

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The future particle physics experiment will require a 20 T-class high field magnet operated under radiation environment more than 200 MGy. High Energy Accelerator Research Organization (KEK) has been performing basic development studies of the radiation-resistant high field magnet using REBCO coated conductors. A goal of this research program is an experimental proof of the small-scale magnet system constructed in mineral insulated indirect cooling coils and radiation-resistant refrigerator to establish technology for a radiation-resistant high field magnet. Trial surface treatment with ceramics to commercial REBCO coated conductors and magnet materials, neutron irradiation of the REBCO conductors, and trial manufacture of the radiation-resistant pulse tube cryocooler are currently in progress. In this contribution, development status of the radiation-resistant superconducting magnet and results of the irradiation test of REBCO conductors will be presented.

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