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Irradiation Studies on HTS Materials in Japan: Results and Future Directions

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Irradiation studies on high-temperature superconductors (HTS), particularly REBCO (Rare-Earth Barium Copper Oxide), are critical for understanding their performance in high-radiation environments, such as those found in particle accelerators and fusion reactors. This work focuses on neutron irradiation experiments conducted in Japan, which investigate the effects of neutron fluences of up to 10^{22} n/m² on the superconducting properties of REBCO materials. These studies are driven by Japan's efforts to develop radiation-resistant technologies for next-generation scientific infrastructure, including the second target station of the Materials and Life Science Experimental Facility (MLF) at J-PARC. The planned installation of a superconducting pion capture solenoid magnet, designed to withstand radiation levels of up to 100 MGy, underscores the significance of these efforts.

This presentation will provide the current status of HTS conductor irradiation studies, including performance evaluation results and future plans aimed at enhancing the reliability and resilience of HTS materials in extreme radiation environments.

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