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M1Or4B-05: Elimination of Training in Nb3Sn and NbTi Superconducting Magnets

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By using TELENE® resin as superconducting magnet impregnation material, training and magnet retraining after a thermal cycle were nearly eliminated in Nb3Sn undulators. This allows reducing operation margins in light sources, and increasing the on-axis magnetic field, thereby expanding energy range and brightness intensity. TELENE is Co-60 gamma radiation resistant up to 7-8 MGy, and therefore already applicable to impregnate planar, helical and universal devices operating in lower radiation environments than high energy colliders. Radiation resistance further increases in TELENE when mixed with high-Cp and/or high-thermal conductivity powders. We herein show that when combined with the ductility and toughness properties of TELENE, these resins display superior training performance with respect to CTD-101K in a variety of Nb3Sn magnet models. In addition, TELENE was proven to eliminate training also in NbTi accelerator magnets. Therefore, TELENE can be used in the Magnetic Resonance Imaging (MRI) industry to solve the NbTi solenoids training problem. The transfer of technology in using TELENE resin to the $40B+ MRI industry will have transformative societal impact on global health.

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