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Use of high-T_c superconducting technology in everyday life: Super-magnets

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High-T_c superconducting technology is a relatively new and demands application verification in public sector, especially in health care and transportation. In this talk, recent trends in high-T_c superconducting material processing will be introduced and then the new super-magnet applications will be presented. The bulk superconducting magnets can trap magnetic fields by order of magnitude higher than the best classical hard magnets and are therefore promising as permanent magnets for use in magnetic drug delivery system (MDDS), for construction of small mobile diagnostic devices, for water cleaning technologies etc. Human's body is so complicated that a controlled drug delivery is extremely difficult. This process can be accomplished by magnetic force in the body by exerting a strong magnetic field on the diseased tissue. As a result, a high drug concentration can

be delivered in a controlled way to the targeted diseased organ. This technology minimizes the taken drug amount and prevents thus side effects. Superconducting material is also used in superconducting DC cables, promising in particular in transport of solar energy as well as in feeding cables for railway system applications. In Japan, more than 11,805 km DC electrified lines are in use. A change of the conventional DC cables to superconducting ones would reduce the resistance losses generated in feeding cables to minimum and are environmentally friendly. Superconducting technology could play an important role in various fields of our everyday life. In this presentation, I will summarize the recent development in use of bulk superconducting materials in superconducting magnets and of superconducting cables in various industrial applications.

Biography

Muralidhar Miryala is the Deputy President at Shibaura Institute of Technology (SIT) and Professor at the Graduate School of Science and Engineering. His main task is to transform SIT into a high rank University. He developed mixed LRE-123 superconductors usable as super-magnets up to 15 T at 77 K, for levitation up to 90.2 K, participated in development of a DC superconducting cable for railway applications; his work was several times presented in TV and regular newspapers in Japan. He is an author and co-author of more than 400 publications and delivered over 100 oral presentations including plenary and invited ones. He holds several Japanese and international patents, received numerous awards, including Young Scientist Award, Director's Award, PASREG Award of Excellence, Best Presentation Award, Amity Global Academic Excellence Award. I am an Editor-in-Chief and Editorial board member of several international journals.

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