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Obtaining MgB2 Superconductors by New Method

For some applications, such as superconducting radio-frequency films in cavities, YBCO films have a too short mean free path. Alternative films are being explored, such as MgB2. The Mg-B system has its own challenges due to the very different properties of magnesium (metal) and boron (semiconductor). Actual sized (diameter 50.8 mm, and 6.25 mm thickness) profiled products of MgB2 have been fabricated and optimal technologic scheme for fabricating them has been developed using a new fast sintering method.
Technological regimes of nontraditional fast consolidation methods have been developed.
The maxima temperature for synthesis MgB2 targets were 10500C, and time of loading ˜ 10 min, maximum pressure ˜ 300kg/cm2.
Magnetic measurements reveal that the targets of MgB2 have critical transition temperature 39K. Investigation of X-ray structure of samples show that the samples have impurities of MgO and MgB4 phases. Physic-mechanical properties of the obtained samples have been already studied.
The future superconducting accelerator could be based on this technology, potentially leading to large cost savings compared to conventional superconducting technology.

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