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## Property of Praseodymium Permanent Magnet for Cryogenic Hybrid Magnet

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High-field magnets are often demanded for advanced scientific studies. Although a hybrid coil design comprising Nb-Ti, Nb<sub>3</sub>Sn, and HTS (High Temperature Superconductors) are potential candidates for such application, the costs of Nb<sub>3</sub>Sn and HTS are expensive compared with Nb-Ti. Permanent magnet can join hybrid magnets. By generating additional field about 1 T by permanent magnets, required amounts of superconducting material may be reduced. Magnetic properties of some magnetic materials have been studied by other work at temperature as low as 100 K. The remanent field of conventional NdFeB magnets decreases at 100 K due to spin reorientation. PrFeB magnets consisting of praseodymium (Pr) instead of neodymium (Nd) do not show such degradation and the coercivity of PrFeB at 100 K is 7 T. The coercivity at 4 K would be estimated as 10 T by a naive extrapolation. Therefore, PrFeB magnets may be applicable as the field booster in the high-field hybrid magnets. In this study, B-H curve, as a primary magnetic property, of a PrFeB magnet sample was measured in the temperature range down to 4 K. Based on the experimental result, magnet configuration for an accelerator dipole magnet is also studied as an example of application.

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