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Particulate magnetic tape for data storage and future technologies

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Enterprise tape drives are widely used at major laboratories in the world, such as CERN, US DoE Labs, KEK and so on as well as data centers in commercial companies. Demands on capacity and speed of I/O inflate infinitely in the tape market. Not only drive technology but also media technology is the key for answering such future requirements. Fujifilm is the world-leading company in the market of magnetic tape media, and has played a major role for evolution of tape technologies in decades.

Secure digital data storage sustainable in very long duration with lower costs is the concern of data centers. Particulate magnetic tapes on linear tape storage systems have been widely used for data backup and archival because of their low TCO, long-term stability, and high reliability. However, in order to meet the further demand, expanding the recording capacity of tape storage is essential. Currently, tape cartridges with a capacity of up to 10 TB are available commercially, and the future roadmap of tape storage systems shows to expand the cartridge capacity to 120 TB. To realize this, technologies to increase the areal density of magnetic tape are required. For this purpose, high-density recording studies using barium ferrite (BaFe) magnetic particles have been carried out. The latest study demonstrated an areal density of 123 Gb/in², corresponding to a 220 TB cartridge capacity in 2015. Furthermore, fine strontium ferrite (SrFe) magnetic particles, which are almost half the size of the current BaFe particles, were also developed; therefore, magnetic tapes are the most effective data storage media to continue enhancing the recording capacity at a low TCO in long-term future.

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