초청강연

Advanced Magnetic Particles for Particulate Recording Media

Department of Materials and Metallurgical Engineering
University of Idaho, Moscow, Idaho 83844-3024, USA Yang-Ki Hong

Magnetic material is a fundamental underpinning of a greater-than-$60 billion dollar information storage industry. Linear recording density of particulate media is approaching 200 Kfci. 250 MB Zip diskette is available in the market, while the recording density of DLT (Digital Linear Tape) has reached 100 Kfci. Advanced metal particles (MP+++) are currently dominant in particulate recording media applications.

Magnetic particle volume must scale downward as linear recording density scales upward to retain a usable media SNR. The SNR is proportional to $\log_{10}$ [number of particles] and decreases with increasing SFD. Low coercivity and large SFD of the advanced metal pigment may limit its application to future high density recording media. Future particulate recording systems will use a GMR reading head, so that high saturation magnetization will not have the advantage. An additional problem is associated with the chemical instability of the metal particles. Chemically stable barium ferrite particles hold high coercivity due to crystalline anisotropy, and reasonable magnetic moment for GMR applications.

The objectives of this talk are to give an overview of available magnetic particles that are currently being used in particulate recording media, and to review the superparamagnetic limit and magnetic interaction in particulate recording media. Beginning with history of magnetic particle development, this talk will identify additional potential problems associated with the advanced metal particle (MP+++) and hexagonal platelet particle (BaFe++). Finally, the possible solutions to these problems will be discussed in material physics aspect.