

강연 II

SINTERED Al_2O_3 -TiC SUBSTRATE FOR THIN FILM MAGNETIC HEAD

Osamu Nakano and Takasi Hirayama

R/D Center, Nippon Tungsten Co., Ltd.

Oaza-Sonobe, Kiyama-cho, Miyaki-gun, Saga, Japan

In 1957, the first magnetic disk drive compatible with a movable head was introduced as an external file memory device for computer system. Since then, magnetic disks have been improved by increasing the recording density, which has brought about the development of a high performance thin film magnetic head. The thin film magnetic head has a magnetic circuit on a ceramic substrate using IC technology. The physical property of the substrate material is very important because it influences the tribology of head/disk interface and also manufacturing process of the head. Al_2O_3 -TiC ceramics, so called ALTIC, is known to be one of the best substrate materials which satisfies this property requirement. Even though the head is not in direct contact with the disk, frequent instantaneous contacts are unavoidable due to its high rotating speed and the close gap between them. This may cause damage in the magnetic recording media and, thus, it is very important that the magnetic head has a good wear resistance.

Al_2O_3 -TiC ceramics has an excellent tribological property in head/disk interface. Manufacturing process of thin film head is similar to that of IC, which requires extremely smooth and flat surface of the substrate. The substrate must be readily sliced into the heads without chipping. Al_2O_3 -TiC ceramics has excellent machineability and mechanical properties. Al_2O_3 -TiC ceramics was first developed at Nippon Tungsten Co. as cutting tool materials in 1968, which was further developed to be used as the substrate materials for thin film head in collaboration with Sumitomo Special Metals Co., Ltd. in 1981. Today, we supply more than 60% of the substrates for thin film head market in the world. In this paper, we would like to present the sintering process of Al_2O_3 -TiC ceramics and its property in detail.