

# Lubrication Technology that Prevents Corrosion Hard Disk Drive Media

March, 2008

## Abstract

To increase the hard disk drive areal recording density, the distance between the read/write head and the magnetic media, called the magnetic spacing, must be made smaller. As shown in Figure 1, generally a hard disk comprises magnetic alloy for information storage, a protective layer against impact and corrosion of the magnetic media, and a lubricant that reduces friction and wear. The thickness of the protective overcoat necessarily gets thinner in accordance with the reduction in the magnetic spacing. However the magnetic layer would easily corrode if a very thin overcoat was deposited since contaminants and water from the environment can easily reach the magnetic layer through the overcoat. Corrosion of the magnetic layer causes failures in the reading and writing of information. Particularly for consumer use, this corrosion problem would become serious due to the severe operational environment. To solve this problem, we have developed a new lubrication technology.

## Technology

In order to prevent corrosion, Fujitsu Laboratories has looked at the properties of the lubricant coated on the protective layer of the hard disk media. We have succeeded in increasing the bonded lubricant by 1.5 times the production level by means of ultraviolet irradiation. The lubricant was made to bond to the protective layer by exposure to ultraviolet light with a wavelength of less than 200 nm. As a result, the surface free energy of the hard disk media that determines the performance of the media surface such as the adsorption of contaminants and water was reduced to be equal or superior to that of Teflon®. We have produced hard disk drives that show anticorrosive properties by decreasing the adsorption of contaminants and water by the hard disk media.

## Application Examples

The characteristics of a HDD using this developed technology are as follows:

- The anticorrosive property is strengthened by more than a 50% increase in the ratio of the bonded lubricant.
- Water-repellent properties which are the same as Teflon® are achieved by an approximately 25% decrease in the surface free energy of the media surface.
- The adsorption of contaminants by the hard disk media surface is reduced by 25% in comparison with the production level.
- Drastic improvements in anticorrosion under hot wet environments is confirmed in comparison with existing technology (Figure 2).

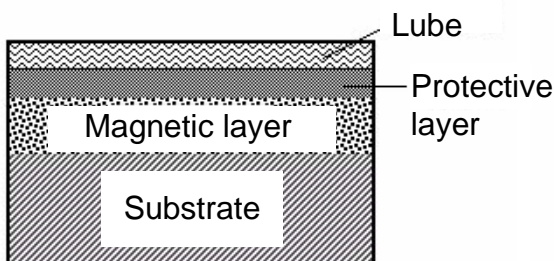


Figure 1. Layer structure of hard-disk-drive media (cross section)

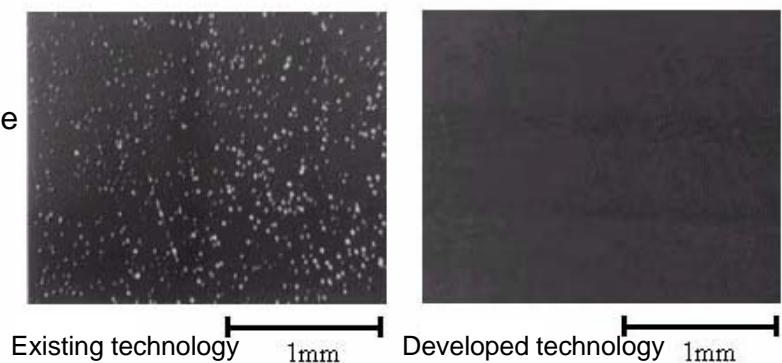


Figure 2. Hard-disk media surfaces after hot wet environmental test (white dots indicate corrosion)