

A magnetic storage device is a device that records and reproduces information by bringing a magnetic head close to a magnetic recording media and applying a magnetic field to magnetize it.

Typical magnetic storage devices include hard disk drives and magnetic tape drives.

Since it is necessary to bring the magnetic head and the recording media close to each other in this way, lubricants are used to reduce friction and wear between the head and the media and to prevent physical damage (data loss) [Ref.1,2,3].

Since then, magnetic storage devices have continued to develop, resulting in improved recording densities due to narrower spacings between magnetic heads and media[Ref.4], and the role of lubricants used here has become important and indispensable.

The lubricants used are PFAS that perfluoropolyethers(PFPE) and their derivatives.

Magnetic storage media lubricants are used because of their own chemical stability, heat resistance, low vapor pressure, low surface energy, and tribological properties[Ref.5,6].

Various lubricants have been proposed and used in accordance with the continuous development of magnetic storage devices[Ref.7,8].

In addition, many patents have been applied for and registered for lubricants for magnetic storage media.

In this way, PFPE and its derivatives have become indispensable for the development of lubricants, which are PFPE and its derivatives, for the past and future development of magnetic storage devices.

I would like to comment on the future information society.

Global digital data generation is growing exponentially[Ref.9] because:

- a) As IoT(Internet of Things) devices become more and more common, data from various devices will be aggregated.

Examples include smart home devices, automobiles, and industrial equipment.

- b) Social media is used as a platform for individuals and businesses to share and exchange information on a daily basis.

Such platforms accumulate posted content, messages, images, videos, etc., increasing the amount of data.

- c) Big data can create value in various fields such as business and research by collecting, storing and analyzing huge amounts of data.

In order to utilize such big data, it is necessary to have a large amount of data.

- d) AI(Artificial Intelligence) technology can assist human intellectual work by automatically extracting patterns from data and self-learning. Therefore, in order to utilize AI, a huge

amount of data is required.

Many of these data stores use magnetic storage devices such as hard disk drives and magnetic tape drives.

If a lubricant that is PFAS cannot be used, magnetic storage media cannot be used.

As a result, it will become impossible to store the ever-increasing amount of data in the future, and it is presumed that the social impact will be extremely serious.

In addition, progress in science and technology and the collection of data and information are essential for the realization of the EU Green Deal.

Specifically, the collection and analysis of data and information is essential for promoting efforts to reduce greenhouse gas emissions in various fields such as energy, transportation, and industry.

For example, there is a need for policies and initiatives based on accurate information, such as monitoring corporate energy consumption and emissions, and analyzing the status of renewable energy adoption.

Under the Green Deal, the European Commission aims to have a large number of Internet of Things (IoT) devices in use in the EU by 2030, and the data from these devices will also help achieve the Green Deal.

In other words, in order to realize the Green Deal, it is important to collect a large amount of data and information, conduct accurate analysis, and promote policies and initiatives based on the results. expected.

In fact, in the field of magnetic storage devices, technological challenges to increase the recording density have continued to meet market demands[Ref.4].

As a new technology for this purpose, heat-assisted recording (HAMR) has been proposed, and its release to the market is imminent [Ref.10].

In order to achieve this, the development of new PFPE derivatives is indispensable, and it is necessary to continue the development of these new lubricants in the future.

On the other hand, PFPE and its derivatives are synthesized from raw materials such as tetrafluoroethylene(TFE) and hexafluoropropane(HFP).

It is necessary to continue to supply the fluorine-based gases that are the raw materials for these.

PFPE lubricants are also applied to magnetic recording media by diluting them with solvents [Ref.11].

Solvents for dilution include HFC-43-10mee, HFE-449s1, etc.

These solvents are already being replaced by solvents with lower GWP to combat global warming.

In this way, magnetic storage media manufactured with PFPE lubricants, which are PFAS, and related fluorine compounds are believed to contribute to the achievement of the above-mentioned important social goals.

For these reasons, we do not deny all PFAS alternatives, but we would like to abolish the grace period for PFPE lubricants in order to achieve economic development and the Green Deal in the EU.