

Near zero-friction lubricant boosts machinery's life

A landmark lubricant material that offers nearly zero friction has been developed by a team of Japanese university researchers.

The material can be processed into a powder and if used to coat moving parts of machinery, the wear due to friction is sharply reduced, prolonging the service life of machinery, the researchers said.

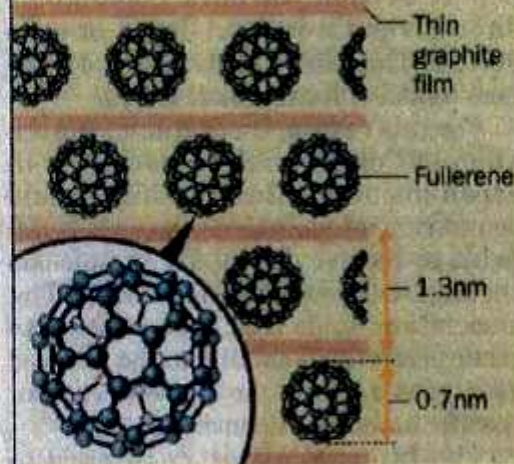
The team, led by Naruo Sasaki, an associate professor at Seikei University, and Koji Miura, a professor at Aichi University of Education, said the material is a multilayer structure made up of arrays of soccer-ball-shaped fullerene molecules sandwiched between thin films of graphite.

The spacing between graphite films is about 1.3nm, and each fullerene is around 0.7nm in diameter. Minute intermolecular forces keep the fullerenes spaced evenly apart.

When a needle is pressed into this structure and moved, it glides with a friction force of 0.4 nanonewtons or less, which is little different from background noise and suggests the material has nearly zero friction. In comparison, the best existing lubricants exhibit a

Silky smooth

Structure of new lubricant



Source: The Nikkei Business Daily

friction force of 1 nanonewton.

The researchers are now working to analyze why the material has so little friction. One explanation is that the fullerene molecules roll and the graphite layers shift, reducing friction. But the researchers believe there are probably some unique forces being manifest at the nanoscale.