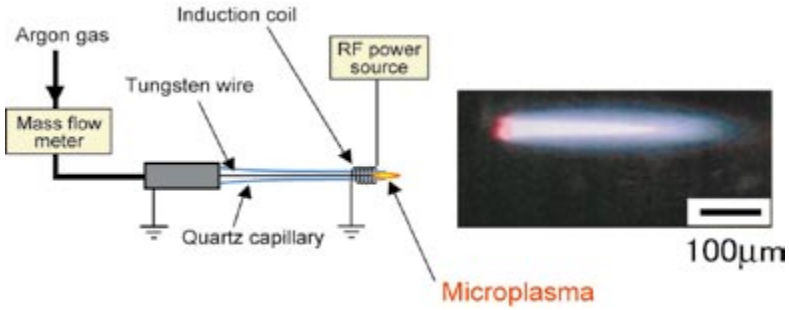
On Demand Material Processing using Microplasma

Takeshi SASAKI
Nanoarchitectonics Research Center
e-mail: takeshi.sasaki@aist.go.jp
AIST Today Vol. 4, No.5 (2004)8

Miniaturization of the plasma results in the generation of a high density plasma even at atmospheric pressure with a low input energy. The novel microplasma CVD technology uses a miniaturized inductively coupled plasma generator for low temperature and ambient pressure nanomaterial processing. As examples, carbon nanotubes can be prepared without a heater; metallic nanoparticles can be deposited directly on polymer substrates. In addition, microplasma CVD can also be applied to advanced manufacturing applications for MEMS devices such as the inner wall coating of micro tubes and capillaries, and mask-less direct patterning on the micrometer scale.

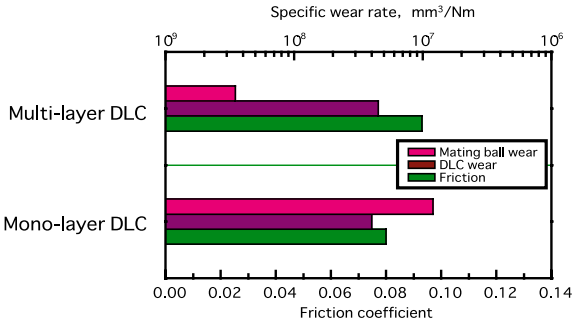


Inductively coupled microplasma generator

Diamond-Like Carbon Films for Water Hydraulic Machinery

Akihiro TANAKA
Research Center for Advanced Carbon Materials
e-mail: a-tanaka@aist.go.jp
AIST Today Vol. 4, No.5 (2004) 10

To prevent the environmental pollution, water hydraulic systems are replacing oil systems. However, the systems have some technical problems, including tribology and corrosion. Many researches have demonstrated that diamond-like carbon (DLC) films have excellent tribological properties under unlubricated conditions. We have developed DLC films covered with Si-doping DLC layer using a plasma-enhanced CVD technique and evaluated their tribological properties in water environment. They had a low friction coefficient of less than 0.1 and a very small wear rate of 5×10^{-8} mm^3/Nm. Moreover, they showed good adhesion to the substrate.



Friction and wear of DLC films in water