

ABSTRACT

Sputtering method for producing amorphous hydrogenated carbon thin films with high sp^3 content. By sputtering the carbon with a pulsed DC power supply having high voltage peaks, a carbon film with remarkably high sp^3 bonding fraction can be obtained. Previously, carbon films with a very high sp^3 fraction film with content as high (e.g. as 80%) could only be produced by methods such as filtered cathodic arc deposition or chemical vapor deposition methods (CVD) such as plasma-enhanced chemical vapor deposition (PE-CVD) and ion-beam deposition operating at some narrowly defined range of deposition conditions. It is very advantageous to use sputtering to create a high sp^3 content film, since sputtering is more manufacturable and has higher productivity compared to CVD or ion-beam deposition methods. The resultant carbon film has excellent durability and corrosion resistance capability down to very low thickness. Also compared to PE-CVD and ion-beam deposition, the new sputtering process produce much less particles and the process can be run on a manufacturing tool for much longer time, thereby increasing the productivity of the machine, and providing disks with higher quality.

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