

diamond-like carbon films

Diamond-like carbon (DLC) films are hard, amorphous films with a significant fraction of sp^3 -hybridized carbon atoms and which can contain a significant amount of hydrogen. Depending on the deposition conditions, these films can be fully amorphous or contain diamond crystallites. These materials are not called diamond unless a full three-dimensional crystalline lattice of diamond is proven.

Note:

Diamond-like films without hydrogen can be prepared by carbon ion beam deposition, ion-assisted sputtering from graphite or by laser ablation of graphite. Diamond-like carbon films containing significant contents of hydrogen are prepared by chemical vapour deposition. The hydrogen content is usually over 25 atomic %. The deposition parameters are (low) total pressure, hydrogen partial pressure, precursor molecules and plasma ionization. The plasma activation can be radio frequency, microwave or Ar^+ ions. High ionization favours amorphous films while high atomic hydrogen contents favour diamond crystallite formation. Because of the confusion about structure engendered by the term diamond-like carbon films, the term hard amorphous carbon films has been suggested as a synonym.

Source:

PAC, 1995, 67, 473 (*Recommended terminology for the description of carbon as a solid (IUPAC Recommendations 1995)*) on page 487