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Diamond-like carbon film with excellent tribomechanical properties deposited by PACVD

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Diamond-like carbon (DLC) films have been deposited on stainless steel wafers by plasma assisted chemical vapor deposition technique. Thickness and roughness of the film were measured by a surface profilometer. Microhardness, friction coefficient and profiles of wear tracks of DLC films were investigated by microhardness tester, ball on disk tribometer and surface profilometer, separately. Results showed that DLC film prepared by plasma assisted chemical vapor deposition displayed excellent tribological and mechanical properties. Roughness Ra of the film with a thickness of beyond 2 micrometers was about 56 nm. DLC film on stainless steel showed a high microhardness (Hv) which was more than 2000. Friction coefficient of DLC was lower than 0.25 when counterpart was a steel ball. Wear rate of the film which was calculated by Archard's classical wear equation after the measurements of wear tracks' cross sectional areas belonged to the order of magnitude of 10 to -8 cubic milliliters per Nm.

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