VF-P004

Improvement of Adhesion Strength of DLC Films on Nitrided Layer Prepared by Linear Ion Source

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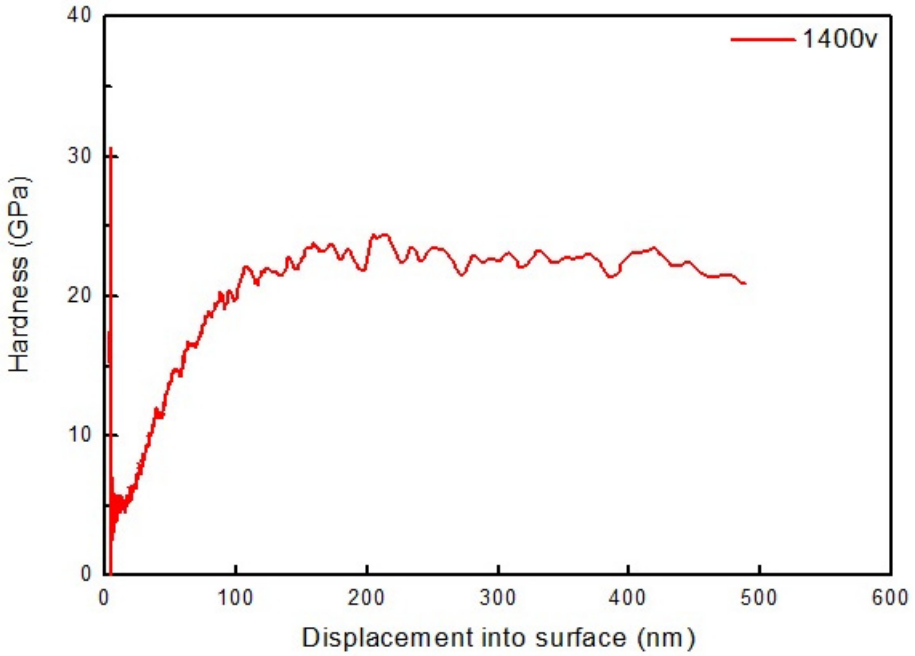
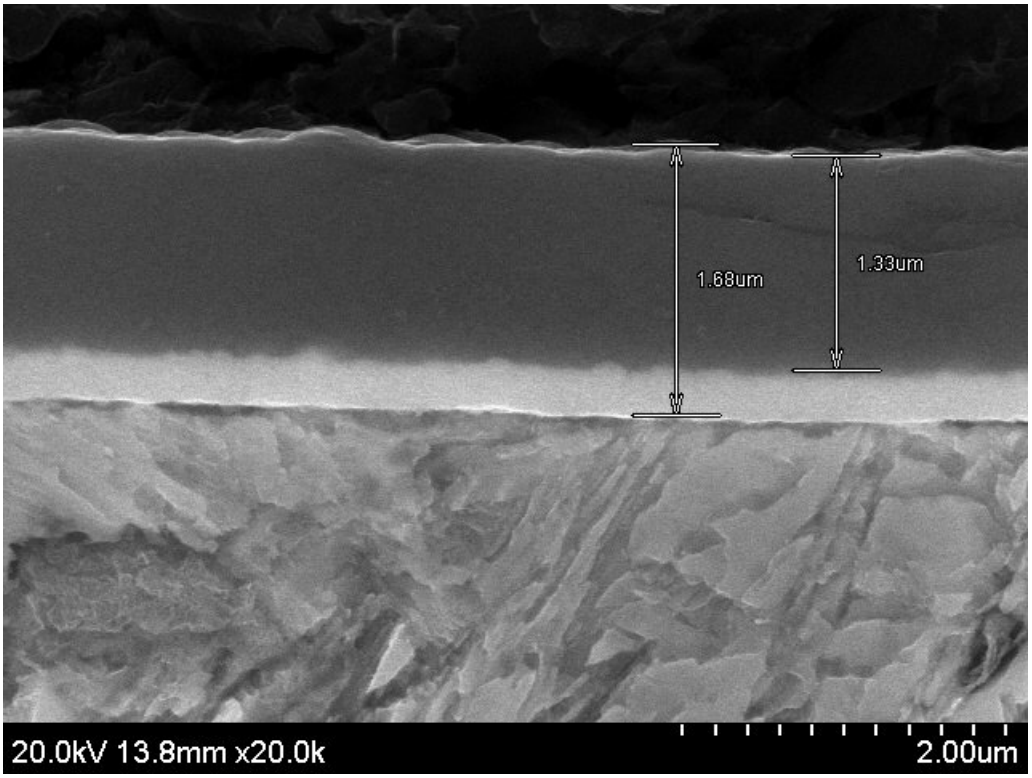
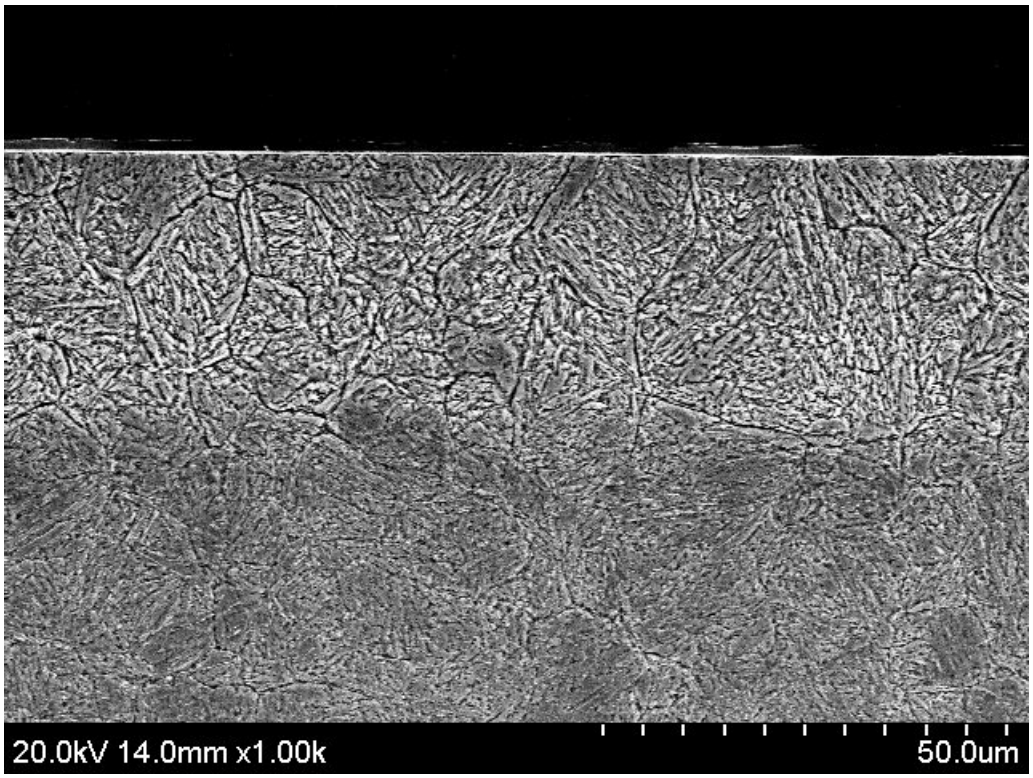
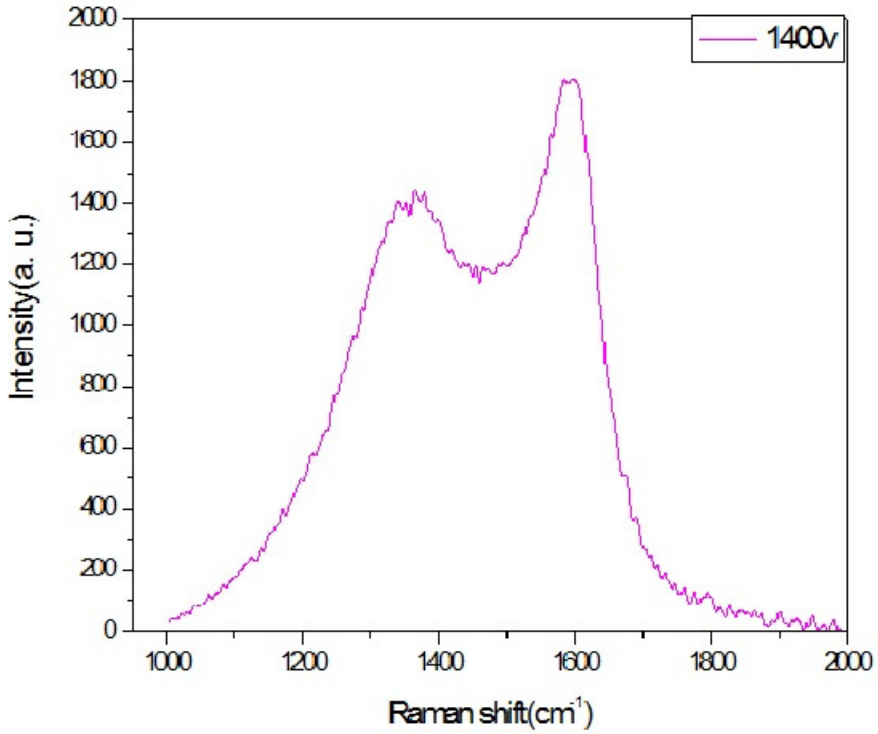
The purpose of this study is to enhance an adhesion between substrate and Diamond-like Carbon (DLC) film. DLC has many outstanding properties such as low friction, high wear resistance and corrosion resistance. However, it is difficult to achieve enough adhesion because of weak bonding between DLC film and the substrate. For improvement adhesion, a layer between DLC film and the substrate was prepared by dual post plasma. DLC film was deposited on nitrided layer by linear ion source. The composed compound layer between substrate and DLC film was investigated by Glow Discharge Spectrometer (GDS) and Scanning Electron Microscope (SEM). The synthesized bonding structure of DLC film was analyzed using a micro raman spectrometer. Mechanical properties were measured by nano-indentation. In order to clarify the mechanism for improvement in adhesive strength, it was observed by scratch test.

Keywords: nitriding, DLC, adhesion, plasma, hardness


1400v
Hardness (GPa)
Displacement into surface (nm)
0
10
20
30
40
0
100
200
300
400
500
600


1.68um
1.33um
20.0kV 13.8mm x20.0k
2.00um


20.0kV 14.0mm x1.00k
50.0um


1400v
Intensity(a. u.)
Raman shift(cm-1)
0
200
400
600
800
1000
1200
1400
1600
1800
2000