**Enhanced Performance by Novel Plasma Boron-Nitriding**

**Jing Hu, Heng Ma, Kunxia Wei**

1Jiangsu Key Laboratory of Materials Surface Science and Technology Changzhou University, Changzhou 213164, China

2National Experimental Demonstration Center for Materials Science and Engineering, Changzhou University, Changzhou 213164, China.

**Abstract:**

In order to further enhance the performance of the components previously treated by plasma nitriding and meet the technical requirements proposed by the cooperative enterprise, plasma boron-nitriding was primarily developed for 42CrMo4 steel at 520℃ for 6h by adding a little Ferroboron around the samples during the process of plasma nitriding. The characteristic of boron modified nitriding layer and the enhanced properties were investigated by optical microscope (OM), XRD, hardness tester and wear tester etc. The results show that plasma boron-nitriding can significantly increase the surface hardness of the sample from 750HV0.05 to 1002HV0.05 due to the formation of vertically wedged into matrix, saw-tooth-shaped boron-iron compounds of FeB and Fe2B, and the thickness of compound layer is increased from 18.78um to 29.44um, the effective diffusion layer is increased from 265um to 355um, which is equivalent to an increase of nitriding efficiency by about 35%. At the same time, the wear resistance of the samples treated by plasma boron-nitriding is significantly enhanced, the wear marks turns to be much shallower and narrower, and the wear rate is decreased from 3.06 mg/cm2 to 1.02mg/cm2.

**Biography of presenting author** (should not exceed 100 words)

Dr. Jing Hu studied Materials Science at Chongqing University, China and graduated as MS in 1990. She then joined the research group of a Materials Research Center, Changzhou, Jiangsu, China. After working for more than 10 years, she received her PhD degree in 2004 at Shanghai Jiaotong University. Then she worked two-year postdoctoral fellowship supervised by Dr Chin at the Materials Research Center, Auburn University, USA, After that, she obtained the position of an Associate Professor at Changzhou University and then turned to be a Professor in 2007. She has published more than 116 research articles in MDPI journals.

**Details of presenting author to be mentioned in the certificate:**

Name: Jing Hu

Affiliation: Changzhou University

Country: China

**Other Details:**

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Session Name: Surfaces, Coatings and Films

Email: jinghoo@126.com

Alternative email: 627897391@qq.com

Contact Number: 0086 15961188296

Twitter/Facebook/LinkedIn: seldom use these

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