

고온 이온주입된 크롬강의 표면특성변화

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The change of surface properties of nitrogen implanted chromium steel in high temperature environment

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Abstract : This article reports changes in the mechanical properties of chromium steel after nitrogen implantation at high temperature. The samples are implanted with 120keV N-ion at doses ranging from 1×10^{18} to 4×10^{18} ions/cm² and at substrate temperature ranging from 25 to 400°C. Nano-hardness and AES(Auger electrons spectroscopy) were measured from nitrogen ion implanted layer. The sliding wear and impact wear properties of the implanted samples were also measured. The results revealed that the hardness and mechanical properties of ion implanted samples depend strongly on the ion doses and implantation temperature. The hardness of the nitrogen implanted sample with 120keV, 4×10^{18} ions/cm², 335°C was measured to be approximately 20 GPa, which is approximately 5 times higher than that of un-implanted sample (H=3.8 GPa). Also, the sliding wear and impact wear properties of nitrogen implanted samples were greatly improved. Detailed experiment results will be presented.

Key Words : Implantation, Nano-hardness, Auger electrons spectroscopy