Nanostructured multilayer Hf/HfN coatings were deposited onto a stainless steel 316 substrate by DC magnetron sputtering in order improve its resistance and hardness. The applied power was 200W on a hafnium target in a DC source, while the number of the nanostructured multilayer of Hf/HfN was fixed to 40. The argon flow was kept constant at 10 sccm whereas the nitrogen flow was variated by 2.5, 3.5, 4.5 and 5.5 sccm. The coatings were characterized by Vickers microhardness, micro tribology, scanning electron microscopy and X-ray photoelectron spectroscopy. The higher hardness value reached 41.89 GPa obtained at 2.5 sccm, considering it as a superhard coating. Additionally, for the 2.5 sccm nitrogen flow, the lowest friction coefficient was obtained at 0.2 leading to the lowers sample wear rate of 4.49 N/m. As the nitrogen flow was increasing, the hardness and the thickness of the coatings decreased while, the friction coefficient and wear rate increased. From the XPS results it was clear to distinguish the presence of three signals for the 2.5 and 3.5 sccm coatings: two related to the Hf-N-Hf and one to the Hf-N-O, however, the higher nitrogen flow coatings of 4.5 and 5.5 sccm evinced an off of one Hf-N-HF signal, which could be related to the inferior mechanical and tribological properties.

**Keywords:** Nanostructured, sputtering, Hf/HfN

**Acknowledgment:**

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