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**INFLUENCE OF XE ION-BOMBARDMENT ENERGY AND ION BEAM NITRIDING ON THE SUBSTRATE MICROSTRUCTURE OF GLOBULIZED 100CR6 STEEL**

Vales, S.(1); Correr, W.(1); Brito, P.(2); Morales, M.(3); Droppa Jr, R.(4); Garcia, J.(5); Alvarez, F.(3); Pinto, H.C.(5);

Universidade de São Paulo(1); Universidade de São Paulo(2); Pontifícia Universidade Católica de Minas Gerais(3); Universidade Estadual de Campinas(4); Universidade Federal do ABC(5); Sandvik Machining Solutions(6); Universidade Estadual de Campinas(7); Universidade de São Paulo(8);

The global trend of seeking economic sustainability has led to need for new materials that generate: increased productivity, higher operating speed, increased service life of tools and dies, and to reduce the current environmental cost. In the modification of metallic surface context, the atomic peening with Xe+ ions has been used to texture the surface of substrate, is to increase the adhesion of hard coatings or to improve the N diffusion. In this study the influence of energy of bombardment with Xe+ ions and the nitriding at low temperatures (380°C) in the surface of 100Cr6 are reported. For this purpose, two acceleration Xe energy 400 and 1000 eV was chosen and combined with N implantation by ion beam. The specimens were characterized by grazing incidence X-ray diffraction, scanning electron microscopy, and atomic force microscopy. The influence of which pre-treatments in the hardness of the samples was evaluated by nanoindentation tests. The combination of bombardment of Xe+ and nitridation with promoted the formation both  $\gamma$ -Fe<sub>4</sub>N and  $\gamma$ -Fe<sub>2-3</sub>N nitrides for previous Xe+ ions at 1000 eV, whereas Xe+ ions at 400 eV led to the formation of only  $\gamma$ -nitride Fe<sub>4</sub>N. The presence of  $\gamma$ -Fe<sub>2-3</sub>N confirms enhanced nitrogen retention in diffusion zone and the formation of a more expressive nitride fraction due to pre physical modifications (grain refinement, texturing, and defects) made by Xe+ ions bombardment at 1000 eV contributing to a more efficient nitriding diffusion process.