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Enhanced ion assistance during the deposition of hard metal nitrides with HiPIMS voltage reversal – 30% increase of deposition rate.

Ivan Fernandez[1], Ivan Fernandez[1], Jose Antonio Santiago[2], Ambiorn Wennberg[1], Victor Bellido[3], Lucia Mendizabal[4], Raquel Gonzalez-Arrabal[5]

[1]Nano4Energy SL, Madrid, Spain [2]Imdea Materiales, Madrid, Spain [3]Gencoa Ltd, Liverpool, United Kingdom [4]IK4 Tekniker, Eibar, Spain [5]ETSII-UPM, Madrid, Spain

ivan.fernandez@nano4energy.eu

This paper demonstrates the benefits of combining positive reverse pulses in HIPIMS plasmas for the deposition of hard metal nitrides. The higher ion bombardment to the growing films, gives rise to higher ion incorporation into the growing film, i.e. higher deposition rate, as well as well as enhanced coating microstructural and mechanical properties. Two different industrial coating systems were used for the deposition of both titanium Nitride and Tantalum Nitride. Thickness, microstructural and compositional studies were performed for the coatings deposited with and without voltage reversal. In all cases, the coating deposition rate is higher when the positive voltage reverse is applied. It significantly increases up to 30% which is associated to the enhanced ion incorporation to the growing film. Changes in the microcrystalline structure as well as increased coating nanohardness are observed with the positive pulse application.

Keywords
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