

Abstract Submitted
for the GEC13 Meeting of
The American Physical Society

A Source of Metal Vapor and Pulsed Beams of High-Energy Gas Molecules ALEXANDER METEL, VASILY BOLBUKOV, MARINA VOLOSOVA, SERGEI GRIGORIEV, YURY MELNIK, Moscow State University of Technology “STANKIN”, DEPARTMENT OF HIGH-EFFICIENCY MACHINING TECHNOLOGIES TEAM — Application to a substrate of negative high-voltage pulses results in 0.1-mm-thick nc-Ti₂N/nc-TiN nanocomposite tough and superhard coatings with an interface width exceeding 5 μm . For production of such coatings on complex-shaped dielectric products a source of broad pulsed beams of high-energy gas molecules has been developed the molecule trajectories coinciding with those of slow metal atoms produced due to sputtering a target by ions accelerated from the ion emitter of the source. The atoms pass through the emitter and together with gas ions enter the process chamber through the emissive grid. The emitter is produced at the gas pressure 0.2-0.5 Pa by glow discharge with confinement of electrons in an electrostatic trap formed by the grid and a cold hollow cathode. Specialty of the source is that the ion emitter potential is equal to zero, negative high-voltage pulses are applied to the grid and high-energy gas molecules are produced due to charge-exchange collisions in two space-charge sheaths: first between the emitter and the grid and then between the grid and the secondary plasma.

Alexander Metel
Moscow State University of Technology “STANKIN”

Date submitted: 04 Jun 2013

Electronic form version 1.4