

Abstract Submitted
for the GEC08 Meeting of
The American Physical Society

***IPD* -The Use of Impulse Plasma in Surface Engineering**

KRZYSZTOF ZDUNEK, Faculty of Mater. Sci., Warsaw University of Technology, Poland — It is evident that impulse plasma ensures both the highest level of nonequilibrium and highest level of vapour ionisation. These conditions seemed to be especially suitable for synthesizing the phases with high energetic barrier of nucleation process. In our methods, called by us as the *Impulse Plasma Deposition (IPD)* the impulse plasma is generated and accelerated in a coaxial accelerator. The only source of electric energy in the plasma process is condenser battery charged to the voltage of order of kVs. During the discharge of condensers individual plasmoids are being accelerated in the coaxial generator by the Ampere force to the speed of the order of 10^4 ms^{-1} and directed to the non-heated substrate. The most characteristic feature of the is that the synthesis proceeds in the impulse plasma itself, with the participation of ions. The crystallization on ions (ionization degree of the impulse plasma is equal to 100%) makes individual plasmoids to be strongly enriched rather in clusters or particles agglomerates with dimensions of order of single nms than the atoms. Because of the very short life time of plasmoids (approx. 10^{-4} sec each) the surface coalescence of particles delivered to the substrate has a limited character. As a consequence the material of the layer has nanocrystalline, globular morphology.

Krzysztof Zdunek
Faculty of Mater. Sci., Warsaw University of Technology, Poland

Date submitted: 12 Jun 2008

Electronic form version 1.4