MATERIAL EFFECTS OF USING OF IMPULSE GAS VALVE IN IPD DEVICE

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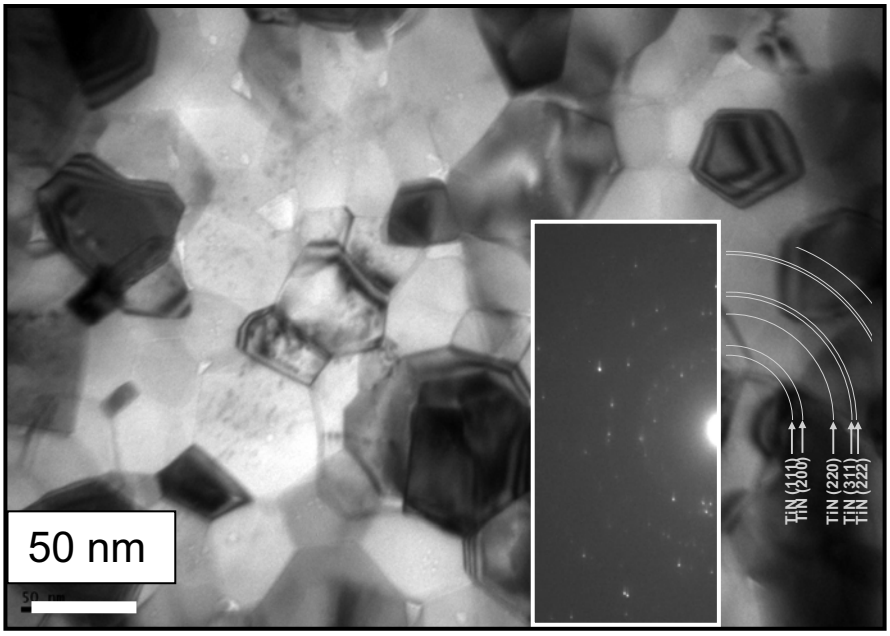
Our previous studies devoted to exploration of growth mechanism during the Impulse Plasma Deposition (IPD) have shown that because of the practically 100% ionization degree solid phase clusters nucleate on ions of the impulse plasma itself. The "dust" of clusters as a substance of plasma are transported to the substrate surface. The clusters are agglomerated at the surface but their coalescence are limited because of that the substrate is cold (the impulse plasma is the only energy source in whole plasma process and the substrate is non-heated by any external heater). As a result of so called cluster-like mechanism of growth the morphology of IPD's coatings is featured by the amorphous-nanocrystalline structure with characteristic agglomerates of globular, almost unidimensional nanograins [1]. Such a structure have been observed in the standard version of the IPD's device with continuous gas flow and the pressure of the order of tens of Pa.

In the paper were described the very first observations of the material effects of the impulse valve using for gas injection to the coaxial accelerator during the impulse plasma deposition. Coatings deposited in such conditions were nanocrystalline with angular grains characteristic for coatings nucleated heterogenically on the substrate surface.



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