Deconvolution of the Al2p spectra obtained for AlN layers materials produced in mode B revealed the interesting relation between the controlled gas injection phase and the relative content of the Al-N and Al-O bonds (respectively, about 73.4 eV and about 74.5 eV). The studies showed that the relative content of the "oxygen bonds" in the layer materials increases with the shortening of the individual pulse duration during the gas injection. In our opinion this probably indicates that during the AlN deposition by the GIMS technology the Al-O bond are formed in the first stage of the AlN layer synthesis as a result of binding of the residual oxygen content (chamber, target material) by a aluminum vapors. In recent years we have focused our attention on how to implement a new magnetron sputtering process. Based on our previous experience in the application of gas injection to control the production of layers by IPD, we used a similar technique in the case of MS methods. Described in this abstract studies included a successful attempt to gain better control over the phenomena associated with the synthesis of layers in a GIMS. It seems to us that we can effectively cut off the tail of aluminum vapor produced in the final phase of the individual targetu sputtering gas injection.

4. Conclusions

In recent time we have focused our attention on new magnetron sputtering (MS) technology by the use the gas injection as a tool for initiating and effective control of plasma generation process during the MS layer deposition (MS -> **GIMS**). Based on our previous experience in the application of gas injection to control the production of layers by IPD, we used a similar technique in the case of MS methods. Studies described above concerns a successful attempt to gain better control over the phenomena associated with the developed by us GIMS technique. It seems to us that by applying the specially designed controller integrated into the electric supply system of the magnetrons we can effectively cut off the tail of aluminum vapor produced in the final stage during the injection of an each individual portion of working gas during the GIMS.

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