THE EFFECT OF THE ION FLOW OF THE PLASMA REACTOR ON THE MICRO-CONDUCTOR ON THE INSULATOR [[1]](#footnote-1)\*)

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Theoretical studies of graphite nanoribbons began even before the first experimental production of graphene [1, 2]. Currently, the properties of both graphene nanowires and nanowires of other materials (silicon, boron nitride, etc.), which are of considerable interest for applications, are being actively studied in nanoelectronics and spintronics. However, the methods for producing such 2D structures are essentially varieties of jewelry art and cannot claim to industrial reproduction. We investigated the possibility of obtaining structures of the "microwire on an insulator" type by plasma etching and revealed that the main reason that impedes the use of traditional plasma processing technologies is the formation of an electrostatic lens in the vicinity of the conductor [3]. This significantly distorts the profile and angular distribution of the ion flux incident on the conductor, thereby causing a strong heterogeneity of the conductor profile. In [4], a method for significantly reducing this heterogeneity was demonstrated. We applied pulses of the bias potential on the conductor in the form of a trapezoid with fairly steep pulse fronts and a linearly increasing voltage between them.

This report shows that modulation of the conductor potential in the form of a quasi-noise signal makes it possible to obtain an almost uniform profile of the central part of the region subjected to etching. In this case, the fronts of the etching rate profile are smoother than at the trapezoidal voltage profile, but one ought to take into account the well-known fact that at etching single crystal structures the etching rate in the regions of crystal defects substantially exceeds that in the region of a perfect structure. Thus, one can expect that nanoribbons with the practically rectangular section profile can be obtained by this technique.

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References

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