

ELECTRIC EMISSION OF CATHODE OF NANOSTRUCTURED LaNi_5 UNDER THE LASER RADIATION

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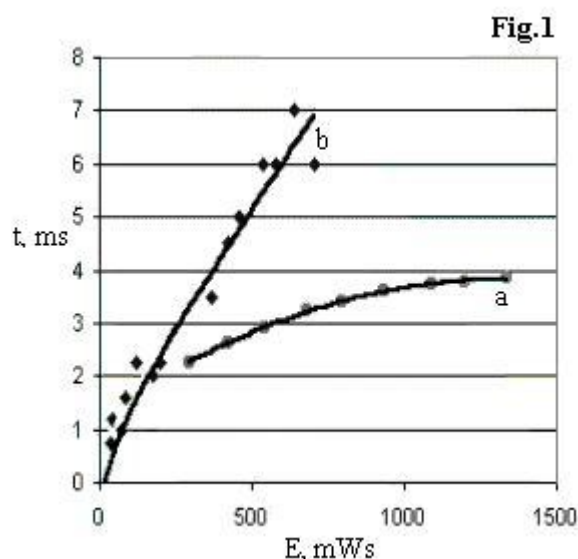
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The work function is one of the important characteristics. All kinds of emitting electrons: photo, thermo, and autoelectric (cold) emission depends of work function. The work function determine regime of using cathodes thermoemission transformer of thermal energy into electric energy.

Thermoemission transformation of short-time intensive thermal flow (up to 40 W/cm²) into electric impulse of big capacity are presented the particular interest to use it as a short-time power source of electrical equipment, generation of monochromatic electromagnetic radiation in wide frequency band, dressing-down laser, actuation turbine, signal devices and so on.

Heating the surface was occurred by impulse of irradiation of YAG:Nd-laser ($\lambda=1,06$ mm) with the energy (E) up to 1,34 Ws. The irradiation was focused on the surface of cathode with the radius of Gaussian spot $r_g = 0,28$ mm. The dependence of the laser impulse duration (a) and the emission current duration of the laser impulse energy (b) are shown at Fig.1. The duration of laser impulse are changed within the limits from 2,3 up to 3,7 ms when minimal and maximal of E valuation accordingly. The duaration of electric emission impulse are changed from $\sim 0,1$ ms under $E \sim 0,01$ Ws up to 7 ms under $E = 0,70$ Ws.

It means, that the electronic emissions are observed in the period of impulse of laser action and after the action of laser impulse. The mechanisms of the effect "aftereffect emission" are connected with the slow cooling field of emission on the surface and low work function (near 1 eV).



The density of emission current of nanosturectured LaNi_5 under the maximal energy of laser irradiation (0,7 Ws) was achieved a high quantity (800 A/cm²). It two order is higher, than for molybdenum at temperature, close to a melting temperature

References

1. Alekseeva I.V., et al. JTP, V. 70, №.11, 91-98 (2000).