The dependence of the magnitude of the thallium peak amperage on the potential sweep speed is analyzed. As can be seen from Figure 4, an increase of the sweeping speed increases the amperage's peak. This may indicate a diffusion mode of the electrode process, because with an increase of the sweep rate, a linear dependence of the amperage density in the anode processes on the square root of the sweep speed is observed. In cathode processes, it is impossible to draw unambiguous conclusions through this parameter, because the processes of recovering intermediate products of trivalent thallium hydrolysis interfere with voltammograms.
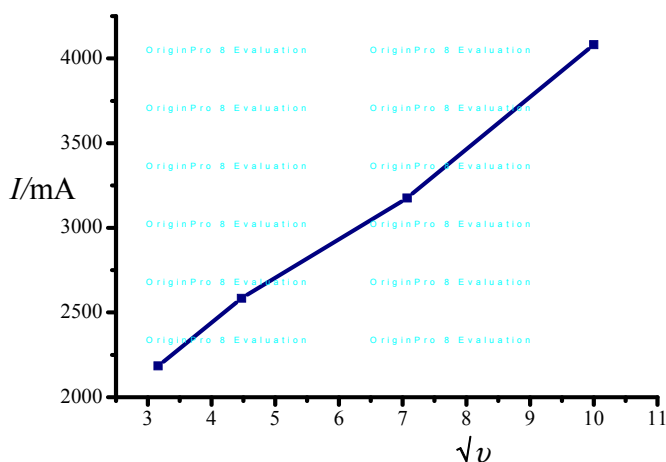

Figure 4. The amperage density dependence of the anode peaks on $\sqrt{\upsilon}$, where υ is the sweep speed (Tl_2SO_4, $c = 10^{-2}$ mole/L)

In order to determine the nature of the limiting stage of the process of precipitation and dissolution of Tl_2O_3, cyclic polarization curves were taken at different rates of electrolyte mixing (Fig. 5).

It can be seen from the Figures 5 and 6 that the speed of the anode and cathode processes increases till $\omega = 500$ rev/min and does not change further, which indicates insignificant contribution of the mass transfer rate to the rate of electrochemical processes. On the other hand, the process can be limited by diffusion to a large extent till stirring speed reaches 500 rev/min.