RELATIONSHIP OF VOLT-AMPERE CHARACTERISTICS OF SOLAR ELEMENTS TO TEMPERATURE

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Today's in the day people to energy has been desire from day to day increased is going of this main reasons to all of us known has been the world of the population sharp respectively increased to go , work release and of industry development of energy each in the field is necessary. Including Energy in Uzbekistan has been need increased is going in our country to energy has been desire full satisfy in order to be ecological clean energy from sources use programs work coming out. Also alternative from energy the sun from energy to use to the road to put the economy development and again recoverable from resources reasonable to use take will come in this regard take going one series affairs own the effect is showing. Especially in our country the sun from energy use possibilities size with another from countries separate stands [1-5].

Half of conductors photoconductivity charge of carriers light under the influence of arousal to the event based on such physicist process electron and of holes light under the influence of connected from the situation agitated to the situation pass-through photoelectric it is called an effect. Otherwise by doing in other words, light under the influence of electrons valent from the level and mixtures at the expense of harvest has been energetic from the level permeability zone and valence from the zone to the energy level of mixtures pass as a result mobile electron and of holes harvest to be internal photoelectric is called the effect (Fig. 1) [6-10].

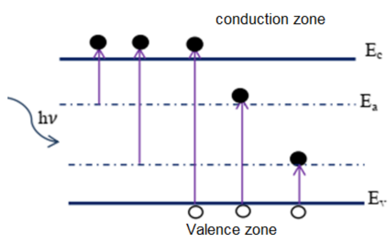

Figure 1. Semiconductors conduction zone.

A lot numerous experiences in the dark in conductivity able to participate electron and of holes mobility with light harvest has been electron and of holes mobility to each other equal to that showed. Semiconductor something to the surface light if it falls, that's it to the surface near in the place addition charge carriers is generated. As a result , in the semiconductor charge of carriers distribution broken , concentration gradient to the body will come. This is an addition charge carriers illuminated surface by semiconductor inside towards diffuses . Therefore, lit surface in front and that's it with together semiconductor inside is also positive and Minus charges each other they cannot neutralize. If lit surface in front positive charges Minus to the charge relatively a lot being If it remains, this is it in the field positive , of a semiconductor that's it from the surface inside field while Minus charged remains. This in a semiconductor volume electricity the field to the body brings. So in a semiconductor electricity field and ECF yield will be [11-16].

It is known that the sun elements volt- ampere characteristic (VACH). The following from the expression defined [5]:

$$j_{\Phi} = j_0\left(\exp\left(\frac{eU}{n'kT}\right)-1\right)-j_{\kappa m}$$

from VACH using removable calculations using in experience the identified VACH to the temperature to be connected explanation possible not. Because of this for previously in (1) short connection until density and saturation until density the temperature effect determination need. It is known that the sun elements exit at VACH in lighting voltage salad work to the voltage (U_{si}). equal to when photocurrent density to zero equal to will be. That's why for (1) U=U_{si} and jf=0 account if taken the following equality is executed:

$$j_{\kappa m} = j_0\left[\exp\left(\frac{eU_{cu}}{n'kT}\right)-1\right]. \quad (1)$$

This from the expression it looks like the sun ng elements short connection until density to the temperature to be connected determination for them saturation until density and salad work voltage to the temperature connections determination need will be it is. In this salty work voltage to the temperature connection for from experiences received to the results according to, empirical method T=0 K extrapolation to do through this parameter for the following expression get can:

$$U_{cu} = (U_{cu0}-\varphi)\frac{T}{T_0}+\varphi \quad (2)$$

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this on the ground $U_{si\ 0}$-T_0=300 K dagsalt work voltage, *ph* – sun of the element potential obstacle height being this parameter to the temperature connection of semiconductors prohibition zone to the temperature connection with one different will be:

$$\varphi = \varphi_0 - \gamma T \quad (3)$$

γ-amorphous semiconductors prohibition zone energetic width temperature coefficient it γis ≈ ($5 \cdot 10^{-4} \div 10^{-5}$) in the eV /K range will be located .
In literature saturation until density for the following expression cited:

$$j_0 = e\mu_C N(E_C) E_S \exp\left(-\frac{e\varphi}{kT}\right), \quad (4)$$

For SE under study this numerical value of parameters directly from VACH identify it won't be. That's why for first saturation until of density temperature dependence the following in appearance let's find out . When When T 0=300 K saturation so that density Assuming $j_0 = j_{00}$ if we do, then from (5) the following we get:

$$j_{00} = e\mu_C N(E_C) E_S \exp\left(-\frac{e\varphi}{kT_0}\right). \quad (5)$$

(6) of account taking (5) if we change saturation until density for the following expression we get:

$$j_0 = j_{00} \exp\left(\frac{e\varphi}{k}\left(\frac{1}{T_0} - \frac{1}{T}\right)\right). \quad (6)$$

(3), (4) and (7) to expression (2) put the sun element short connection until density to the temperature tie up for the following in appearance the equation we get:

$$j_{\kappa m} = j_{00} \exp\left[\frac{e(\varphi_0 - \gamma T)}{k}\left(\frac{1}{T_0} - \frac{1}{T}\right)\right]\left[\exp\left[\frac{e(\varphi_0 - \gamma T)}{n' k T_0}\left(\frac{U_{cu0}}{(\varphi_0 - \gamma T)} - 1 + \frac{T_0}{T}\right)\right] - 1\right]. \quad (7)$$

Now the sun element in lighting VACH to temperature effect explaining giver expression to determine we will (7) and (8) to account take from (1) the following we get :

$$j_{\Phi} = j_{00} \exp\left[\frac{e(\varphi_0 - \gamma T)}{k}\left(\frac{1}{T_0} - \frac{1}{T}\right)\right]\left\{\exp\left(\frac{eU}{n' kT}\right) - \exp\left[\frac{e(\varphi_0 - \gamma T)}{n' k T_0}\left(\frac{U_{cu0}}{\varphi} - 1 + \frac{T_0}{T}\right)\right]\right\}. \quad (8)$$

In literature the sun of the elements non-ideality coefficient practical in terms of to the temperature depends not to be shown. That's why from (9) for using the sun elements to VACH temperature effect description possible [17-24].

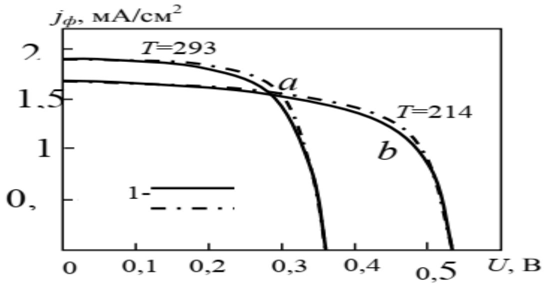

Fig. 2. Amorphous silicon VAX of basic SE at 214 *K* and 293 *K* temperatures .
1-experiment and from formula 2-(9) received count results.

As can be seen from Fig. 1 as it is experience and calculation results big and small in voltages suitable will come. But VACH's effective power defined points nearby this results between serious didn't happen difference surface will come ours. VACH's in our opinion being viewed at the point curve of the line another to the field relatively the sun in the elements harvest divisor photocurrent strong to change occurs. It is known that the diode non-ideality of the coefficient value through it passing electricity so that character determines [25-28]. That's it remind transition must count and experience results suitable coming for the sun elements of VACH non-ideality of the coefficient value as follows to choose right came: n_1=1,0034 at $T_1=214\ K$, n_2= 1,0061 at $T_2=293\ K$, n_1 and of n_2 difference not so much big not. That's why for this the difference experience error within the limit considered to be located it is necessary.

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