Determining the power and efficiency of a solar cell

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1 Solar cell short circuit current dependence on illuminance.

The solar cell was connected to a multimeter with two wires and the optimal direct current measuring range was chosen (2mA).

Then, the lamp was mounted on a holder in the highest possible position and the solar cell was placed under it. The light source was lowered averagely 30 times and after every lowering the value of illuminance in lx and circuit current in mA were measured. During the experiment measured range of multimeter was changed to 20mA when it became too high.

All the data were entered in Google Sheets, the table is shown on the page 2 (table 1). To find the value of power of light Pv in mW for each value of illuminance the equation $Pv(mW) = E \cdot S \cdot 3.5 \cdot 10^{-4}$ was used, where E is given in lx and the S in cm^2 ($S = 9cm^2$).

To study the correlation between Pv and I a graph was drawn up and the equation of the trend line was calculated (figure 1)

E (lx)	**I (mA)**	**Pv (mW)**
561	0.100	1.767
591	0.106	1.862
611	0.109	1.925
635	0.114	2.000
657	0.118	2.070
729	0.131	2.296
781	0.141	2.460
843	0.152	2.656
890	0.161	2.804
933	0.170	2.939
970	0.177	3.056
1,052	0.193	3.314
1,092	0.199	3.440
1,182	0.216	3.723
1,258	0.231	3.963
1,393	0.255	4.388
1,481	0.270	4.665
1,579	0.290	4.974
1,738	0.320	5.475
2,060	0.380	6.489
2,430	0.448	7.655
2,930	0.546	9.230
3,560	0.669	11.214
4,650	0.877	14.648
5,330	1.014	16.790
6,290	1.237	19.814
7,250	1.410	22.838
8,470	1.605	26.681
10,850	2.160	34.178
13,400	2.820	42.210

Table 1: Data measured for task 1

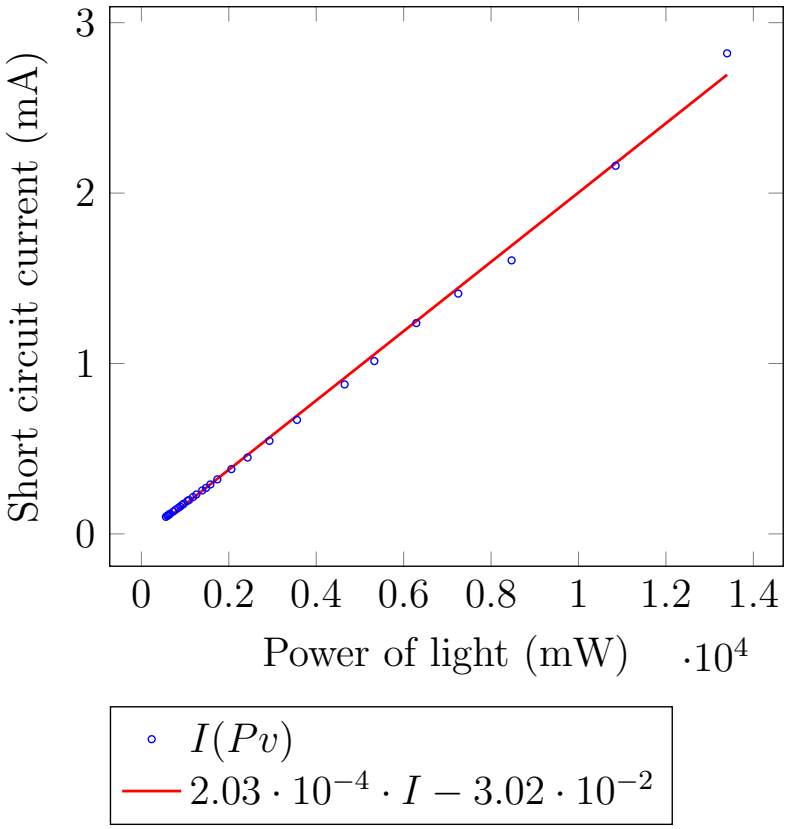

Figure 1: Short circuit current vs power of light