

FOTO-ISSIQLIK-TERMoeLEKTRIK GENERATORNING TUZILISHI VA ISH TAMOIYILI

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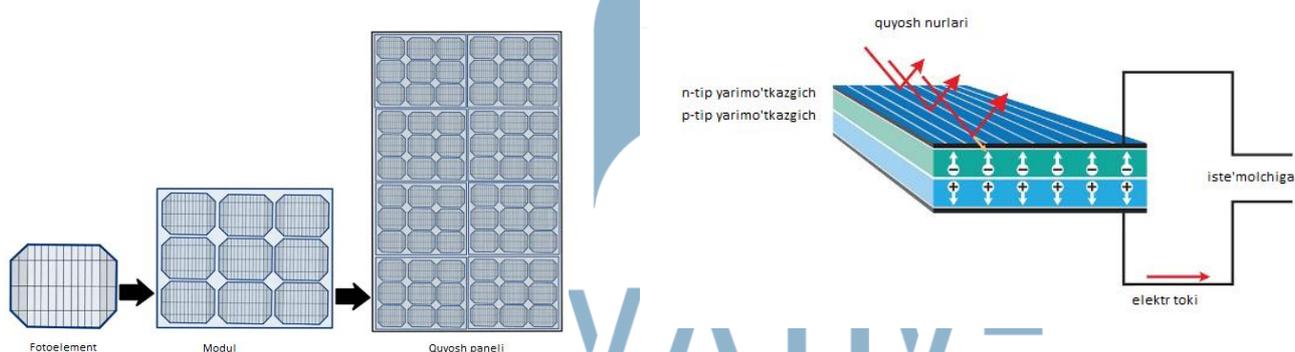
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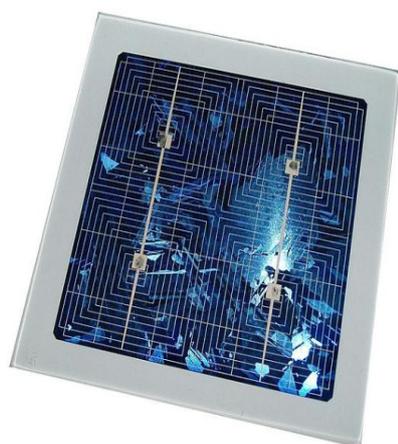
Foto-issiqlik-termoelektrik generator asosan uchta qismdan fotoelement, termoelektrik generator va quyosh havo isitgich kollektorining birlashtirilganidan iborat[1]. Foto-issiqlik-termoelektrik generator bir vaqtning o'zida quyosh energiyasini ham elektr energiyasi ham issiqlik energiyasiga aylantiradi. Ma'lumki fotoelement va termoelektrik generator elektr energiyasi ishlab chiqaradi. Quyosh havo isitgich kollektori esa quyosh energiyasini issiqlik energiyasiga aylantiradi.

Quyida foto-issiqlik-termoelektrik generatorni tashkil etuvchi qurilmalarni batafsil ko'rib chiqamiz.

Quyosh batareyasi, quyosh paneli - fotoelektrik o'zgartirgich (fotoelement) larning birlashtirilgan to'plami - quyosh energiyasini to'g'ridan-to'g'ri elektr tokiga aylantiradigan yarim o'tkazgichli qurilma (1-rasm)[2]. Fotoelementning ish tamoyili 2-rasmda keltirilgan [3]. Fotoelement va quyosh panelning umumiy ko'rinishi 3 va 4-rasmda ko'rsatilgan [4,5].



1-rasm. Fotoelement, quyosh batareyasi va 2-rasm. Fotoelementning ish tamoyili quyosh paneli.



3-rasm. Fotoelement.



4-rasm. Quyosh paneli

Termoelektrik generator (Pelte elementi) ning umumiy ko'rinishi 5-rasmda ko'rsatilgan[6]. Ish tamoyili esa 6-rasmda keltirilgan [7].

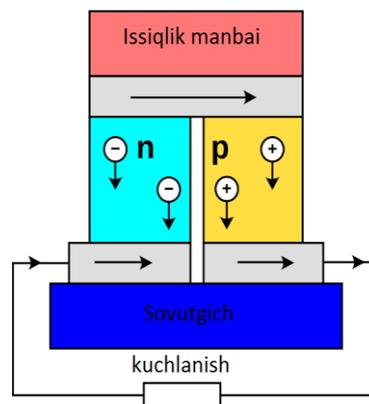


a)

5-rasm. Pelte modullarining umumiy ko'rinishi



b)

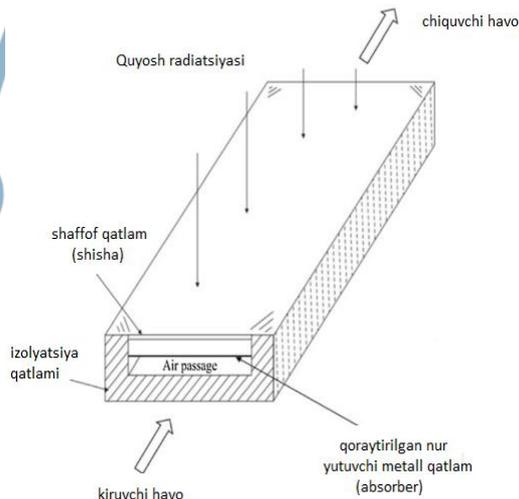


6-rasm. Termoelektr generatori (Pelte elementlari asosida) har xil Zeebek koeffitsientiga ega bo'lgan materiallardan iborat (p- va n-yarim o'tkazgichlar). Yuk (kuchlanish) olib tashlanganda, oqim to'xtaydi va sxema termojuft vazifasini bajaradi.

Quyosh kollektorining umumiy ko'rinishi 7-rasmda ko'rsatilgan [8], ish tamoyili esa 8-rasmda ko'rsatilgan[9].



7-rasm. Quyosh havo isitgich kollektorining umumiy ko'rinishi

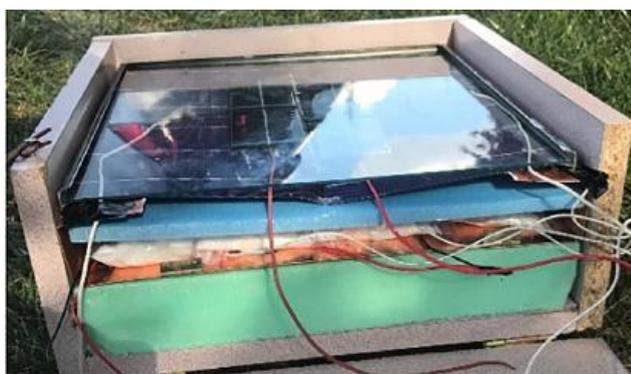


8-rasm. Quyosh havo isitgich kollektorining ish tamoyili sxemasi

Foto-issiqlik-termoelektrik generatorning umumiy ko'rinishi 9-11-rasmlarda ko'rsatilgan [1,10,11]. Foto-issiqlik-termoelektrik generatorning ish tamoyili 12-rasmda keltirilgan[12].



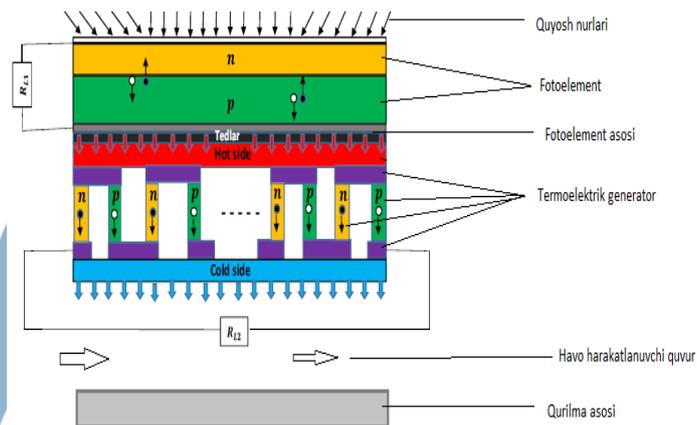
9-rasm. Quyosh panelining orqa qismiga biriktirilgan termoelektrik generator (Pelte element)lar.



10-rasm. Foto-issiqlik-termoelektrik generatorning qirqimi



11-rasm. Foto-issiqlik-termoelektrik generatorning umumiy ko'rinishi



12-rasm. Foto-issiqlik-termoelektrik generatorning ish tamoyili

Foto-issiqlik-termoelektrik generatorning matematik modeli ni ishlab chiqish va hisoblashlar o'tkazish uchun [13] da keltirilgan ma'lumotlardan foydalanildi.

1-jadval

Qurilma bo'yicha o'tkazilgan hisoblashlar natijalari

Vaqt, soat	$I_T, W/m^2$	Q_{is}, MJ	Q_{PV}, MJ	Q_{TEG}, MJ	η_{PV}	η_{TEG}	η_{th}	η_T
8	32	0.034	0.018	0	0.153	0	0.296	0.449
9	199	0.237	0.106	0.001	0.147	0.001	0.33	0.478
10	456	0.506	0.231	0.005	0.141	0.003	0.308	0.452
11	652	0.712	0.318	0.01	0.136	0.004	0.303	0.443
12	771	0.862	0.366	0.013	0.132	0.005	0.311	0.448
13	810	0.932	0.38	0.015	0.13	0.005	0.32	0.455
14	764	0.898	0.36	0.013	0.131	0.005	0.326	0.462
15	631	0.758	0.306	0.009	0.135	0.004	0.334	0.473
16	417	0.539	0.21	0.004	0.14	0.003	0.359	0.502
17	167	0.295	0.088	0.001	0.146	0.001	0.35	0.497
18	24	0.13	0.013	0	0.15	0	0.36	0.51

Ekologik tahlil. Quyosh qurilmalaridan foydalanganda atrof-muhitga chiqariladigan zaharli gazlarning miqdori kamayadi. Zaharli gazlardan biri bu CO₂ ya'ni karbonat angidrit gazi hisoblanadi. Zaharli gazlarning atrof-muhitga chiqishining kamayishi quyidagi ifoda orqali aniqlanadi [14]

$$M_{CO_2} = \frac{Q_f}{\chi \cdot \eta} K_{CO_2} \frac{44}{12} \quad (22)$$

bunda ΔM_{CO_2} - quyosh qurilmalaridan foydalanganda atrof-muhitga chiqariladigan zaharli gazlar miqdorining kamayish massasi, kg; Q_f - quyosh qurilmasidan foydalanish natijasida olingan foydali energiya, J; χ - an'anaviy yoqilg'ining solishtirma yonish issiqligi, J/kg; η - issiqlik manbaining foydali ish koeffitsiyenti; K_{CO_2} - turli energiya manbalari uchun uglerod emissiyasi koeffitsiyenti.

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