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About my research group

7 teachers

5 Ph.D students and a post-doctor

12 Master students

research field 500 m²

about 50 experimental instruments



About my research Contents



Mini type solar air-conditioning

Mini-type solar power system

Light guiding green illumination

New trough concentrator







Solar energy desalination

In this field, we have completed many new designs. Many experimental tests have been carried out. Ten research papers have been published or accepted in Chinese or international journals. Some of the paper were published in Solar Energy , Desalination and DWT.

本京理エ大学 A perfect solar desalination system







This is a practical operation system





An advanced desalination system



A Multi-Effects Regeneration Unit with Horizontal Tube Falling Film Evaporation And Inner System Self-Equilibrium



Seawater Desalination System



- 1、Plant shell
- 2, Fresh water tube
- 3. Salty water connection
- 4. Vapor and liquid separator

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- 5、Tank gauge
- 6. Condensed seawater pump
- 7、Water and salt separator
- 8、Water circulating pump
- 9、Sprayors
- 10, Water circulating pump
- 11, Fresh water collection tray
- 12, Seawater intake coil
- 13, Vacuum pump
- 14. Seawater intake control valve
- 15, Condenser
- 16、2nd stage evaporator-condenser
- 17, 1st stage evaporator-condenser
- 18、Evaporator

Seawater Desalination System







3 D show of the evaporator-condenser











Outer looking of the plant



Solar heat collection system



Solar high-heat collector;
 Liquid tank;
 Circulating pump;
 Heating water tank;
 Heating water circulating pump;
 Heating water separator;
 Heat exchanger





Solar power generation system



- 1、Solar batteries
- 2、Solar power
- generation controller
- 3, Converter
- 4. Automatic control cabinet
- 5、Batteries



LiBr absorption type desalination system





A single effect desalination unit





A multi effect desalination unit





A multi effect desalination unit





Heat pump desalination unit

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A new design domestic solar still









2. Mini type LiBr absorption solar air-condition system

In this field, Several new LiBr absorption type solar air-condition system have been designed and tested. Especially, the thermosiphon solution elevation pumps with single or multi lunate channels have been deeply investigated.



A performance test system of the thermosiphon solution elevation pumps with single or multi lunate channels



multi-effect regeneration solar evaporation desiccant air-conditioner



A experimental unit



NH₃ absorption type solar chiller



A experimental unit



A integrated solar chiller









3. Mini-type solar power systems with light guide congregation energy

They include four research aspects

- multi- curving surface compound solar
 Concentrator
- Mini-type solar power systems with light guide congregation energy
- new solar furnace with light guide congregation energy and high temperature phase-change heat storage



multi- curving surface compound solar Concentrator

A simple solar funnel





The design of the new funnel solar concentrator

There are two parabolics with same size and aperture upturned. They are moved a distance each other keeping their symmetrical axes parallel. Curve DA and CB respectively is the section of two parabolic curves. F_1 and F_2 respectively is their focus point. AE and BG are two straight line segments. Owing to the mirror reflecting the two foci is overlapped at the point *F*.





The design of the new funnel solar concentrator

Here is its concentrating light process. We can get a real focus.



Light re-concentration in the new funnel solar concentrator

We need to concentrate the light further. So, we add a redirector as the figure



QLight redirector (7) is also a paraboloid. Its focus is also in *F*. The light funnel can move tracing the sun with *F* as a fixed point. As long as the focus of the light redirector is fixed, its output direction can change arbitrarily. So, the movement of the light funnel is unattached with the light redirector(7). At the same time, the light intensity is added greatly.

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Two new designs of funnel type solar concentrator







The experimental units







New solar furnace with light guide assemble energy and high temperature phase-change heat storage





A experimental furnace







The storage energy curve of the furnace





The reflection style same direction focusing high temperature solar thermal collection unit with holistic tracking function







Mini-Sterling engine driven by solar funnel





Mini-Sterling engine driven by solar funnel





Different designs of the furnace









The heat storage system



The heat storage system



A experimental solar boiling water device







This new trough solar concentrator

It includes several parts as follows:

1—the new compound
parabolic concentrator;
2—reflection plane mirror;
3—lower trough parabolic
concentrator

4—sun light;

5—symmetry axis;

7—transparence vacuum glass tube;

8—high-temperature solar receiver;





OPERATION PRINCIPLE OF THE NEW CONCENTRATOR



The temperature of the receiver (8) will increase after absorbing the solar energy so that the working medium in the receiver will be heated. Finally, the high-temperature thermal energy is sent to user through the working medium.

The operation mode of the unit



A novel solar trough concentrator





THE NEW CONCENTRATOR





THE NEW CONCENTRATOR





Glass reflector trough concentrator





Specially made receiver

1.Overlength (4m) ; 2.Double face coated in fin





Light guiding green illumination

Light fibre transmiting light operation





light guiding pipe and green illumination system





Some light guiding fibre





New solar concentrator







New solar concentrator







A experimental solar light fibre lamp







5.Freezing-resistant and imaging wall-type solar collector





6.Freezing-resistant and imaging wall-type solar collector



