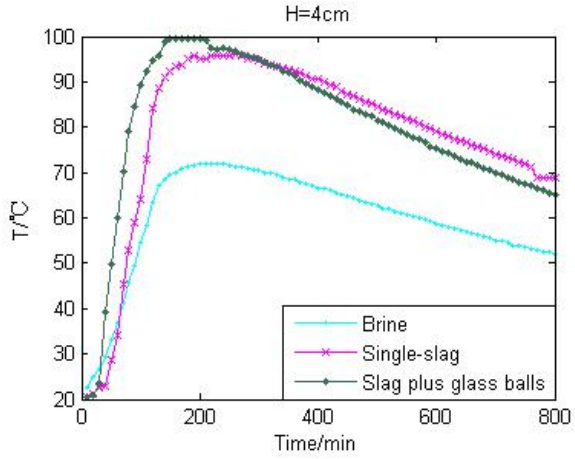
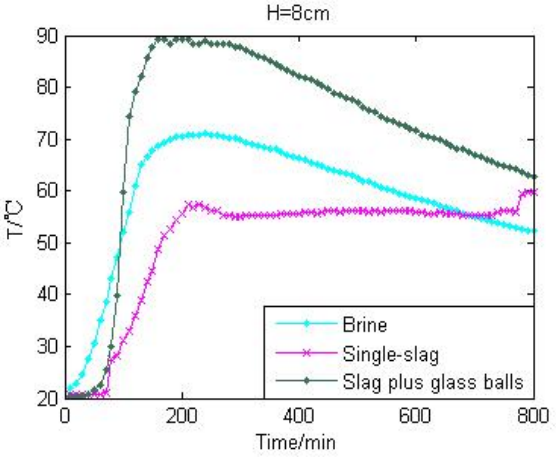
As is shown in Figure 3, different experimental data with the same depth was compared. Figure 3(a) is temperature contrast of 4cm from the bottom of solar pond, and we can see with the same heating time, temperature of slag plus glass balls rise faster, but the downward rate is slightly lower than the slag experiments; Figure 3(b) is temperature contrast of 8cm from the bottom of solar pond, you can clearly see that within a minute or two at the beginning of experiment the rise rate of slag plus glass balls experiment is lowest, followed by slag experiment, but as the experiment continues, rising rate of slag plus glass balls experiment is significantly higher than slag experiments.



(a)



(b)

Fig.3 Temperature development of different depths from the bottom of the solar pond

As is shown in Figure 4, the fastest rise rate of temperature was slag plus glass ball experiment at 4 cm from the bottom of the solar pond, and followed by slag plus glass ball experiment at 8 cm from the bottom of the solar pond, and followed by slag experiment at 4 cm from the bottom of the solar pond; the fastest downward rate of temperature was black experiment with brine only. But the downward rate of the slag plus glass balls experiment was slightly lower than single-slag experiment.

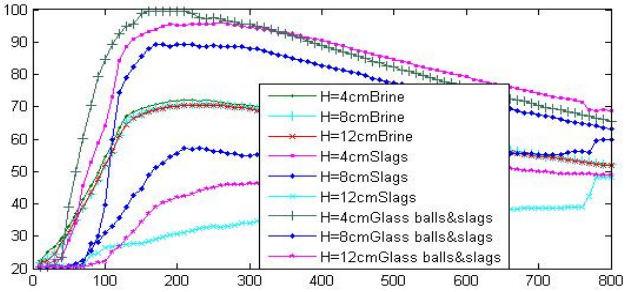


Fig.4 Temperature development of different depths and different media

IV. CONCLUSIONS

(1)Within a minute or two at the beginning of the experiment, the rising rate of slag plus glass balls experiment was lowest, followed by the single-slag experiment. The fastest rising rate of temperature was black experiment with brine only;

(2)As the experimental time increases, the rising rate of slag plus glass balls experiment was significantly higher than the black experiment with brine only and single-slag experiment. The fastest rise rate of temperature is slag plus glass ball experiment at 4 cm from the bottom of the solar pond;

(3)The downward rate of the slag plus glass balls experiment was slightly lower than single-slag experiment. The fastest downward rate of temperature was black experiment with brine only;

(4) Both in black experiment with brine only, single-slag experiment and slag plus glass balls experiment, closer to the bottom of solar pond, the upward trend of temperature significantly higher.

REFERENCES

[1] J. Wang and J. Seyed-Yagoobi, “Effect of water turbidity on thermal performance of a salt-gradient solar pond,” in Vol.54 of Solar Energy (1995), pp.301-308

[2] LUH and SWIFT A H P, “Advancements in salinity gradient solar pond technology based on sixteen years of operational experience,” in Solar Energy Eng, (2004), pp.126

[3] Liexian Xie, “Research on thermal collector and storage performance of small solar pond,” in Vol.30 of Guangxi Forestry Science (2001), phase 3, pp.129-131.

[4] Wence Sun and Yongping Zhou, “Study of salt-pan solar pond,” in Vol.43 of Journal of Dalian University of Technology (2003), phase 2, pp. 176-180

[5] Hull J R, “Maintenance of brine transparency in salinity gradient solar ponds, “ in Vol.112 of Journal of Solar Energy Engineering (1990), phase 5, pp. 65-69.

[6] Hua Wang et al, “Nonlinear dynamic behavior of non-convective zone in salt gradient solar pond,” in Solar Energy 85 (2011), pp. 1745-1757

[7] Wence Sun et al, “ Experimental study on effect of the porous medium on the thermohaline proliferation of solar pond,” in Vol.50 of Journal of Dalian University of Technology (2010), phase 1, pp.46-51

[8] Hua Wang, in: edited by Vol. 30 of Acta Energiae Solaris Sinica (2009)（in Chinese）, issue 7, pp.905-910

[9] Hua Wang, in: Experiment and numerical simulation of a seawater solar pond, edited by International Conference on Power Engineering (2007)

[10] Domestic and foreign non-metallic materials manual, published by Jiangsu Science and Technology Press (2006)