Project 8　HOU Zhihao

The overall project process and content are summarized in the document **EXPERIMENT ANALYSIS OF MULTI-FUNCTIONAL TROMBE WALL MODUL BASED ON ENHANCED HEAT TRANSFER MICRO-CHANNEL PLATE.pdf**, which is my undergraduate innovation and entrepreneurship project paper, which describes the experimental process and results in detail.

1.Project Introduction

A traditional trombe wall has the problems of single purpose and temperature-high in summer which affects human comfort and increases energy consumption of air conditioning. This study puts forward a kind of multi-function trombe wall,which means that the venetian blinds made from several paralleled microchannel plates are installed in the air gap of the trombe wall. Water is circulated in the microchannel to take away excessive heat in hot summer. which can not only alleviate the problem of overheat in summer and but also generate the domestic hot water at the same time. The experimentalresults show that the temperature of the back plate of the multifunction trombe wall is 24.4% lower than that of the traditional trombe wall,and the average water temperature in the water tank reached 46.80 ℃.

Therefore, the multi-function trombe wall can utilize the solar energy efficiently because of supplying hot water and simultaneously reducing overheat in summer.

2. Experimental ideas

The comparative experimental platform is located in the southern campus of Hefei University of Technology (Hefei, 31 ° 51 ′ N, 117 ° 17 ′ E). As shown in Figure 1, the experimental platform includes a multi-functional louvered solar collector wall module and a traditional collector wall module of the same size. As shown in Fig.2, the front of the wall is sealed by a glass cover plate of 1600 mm × 900 mm, and the back of the wall is a black insulation board of 50 mm thickness. There is a 100 mm thick air interlayer between the insulation board and the glass cover plate. The middle position of the air interlayer is a plurality of microchannel plates of 1200 mm (length) × 30 mm (width) × 3 mm (thickness). The inclination angle between the microchannel plate and the horizontal plane is 30 °, and the left and right sides are respectively connected to the flat water collecting pipe. The inlet and outlet of the two water collecting pipes and the heat preservation water tank are connected by PPR pipes to form a closed circulation system, in which the circulation pipeline is also equipped with pumps, valves and other components, and the PPR pipes are all treated with heat preservation cotton. To make the water in the collecting pipe flow evenly through each microchannel plate, the whole water system is designed as a synchronous closed-loop loop.

3. Summary and enthusiasm for the UNFoLD lab

This is the product of my undergraduate studies. Although immature, it marks a significant milestone for me and has been very beneficial. I was initially drawn to joining the UNFoLD lab by the dynamic video of vortex formation featured on the lab's homepage. The intuitive experimental conditions were captivating (which is exactly what I strive for: clearly presenting project results through visual videos). I continue to learn, constantly challenge myself, and truly enjoy these fascinating experiments. Of course, my years of scientific experience tell me that behind these videos lie countless nights of dedicated research. I hope to hone my theoretical application and problem-solving skills through practical projects. If I am fortunate enough to join the lab, I believe UNFoLD will inspire new ideas and enable me to achieve fruitful research results.