



Anti-Frosting and Defrosting Technologies for Air Source Heat Pumps

A novel technology of air source heat pump to realize efficient and continuous heating supply

Technologies d'Anti-Glaçage et de Dégivrage pour les Pompes à Chaleur à Air

Une nouvelle technologie de pompe à chaleur à air pour un chauffage efficace et continu

Introduction

Air source heat pump (ASHP) is widely used for cooling in summer and heating in winter. However, frosting seriously impacts its heating performance (Fig.1), and current defrosting methods have to interrupt heating for defrosting, leading to its performance decay and discontinuous heating.

Our invention can achieve efficient frost suppression by using superhydrophobic treatment on the heat exchanger surface in ASHP (Fig.3 and 4). A defrosting method is put forward by using air flow acting on the heat exchanger to remove condensate droplets at the early stage of frosting (Fig.5 and 6), which avoids performance decay of ASHP and realizes continuous heating supply. Apart from improving thermal comfort, the heating supply efficiency of ASHP is increased by 12.1%.



Fig.1 Frosting on the outdoor heat exchanger of ASHP impacting the heating efficiency

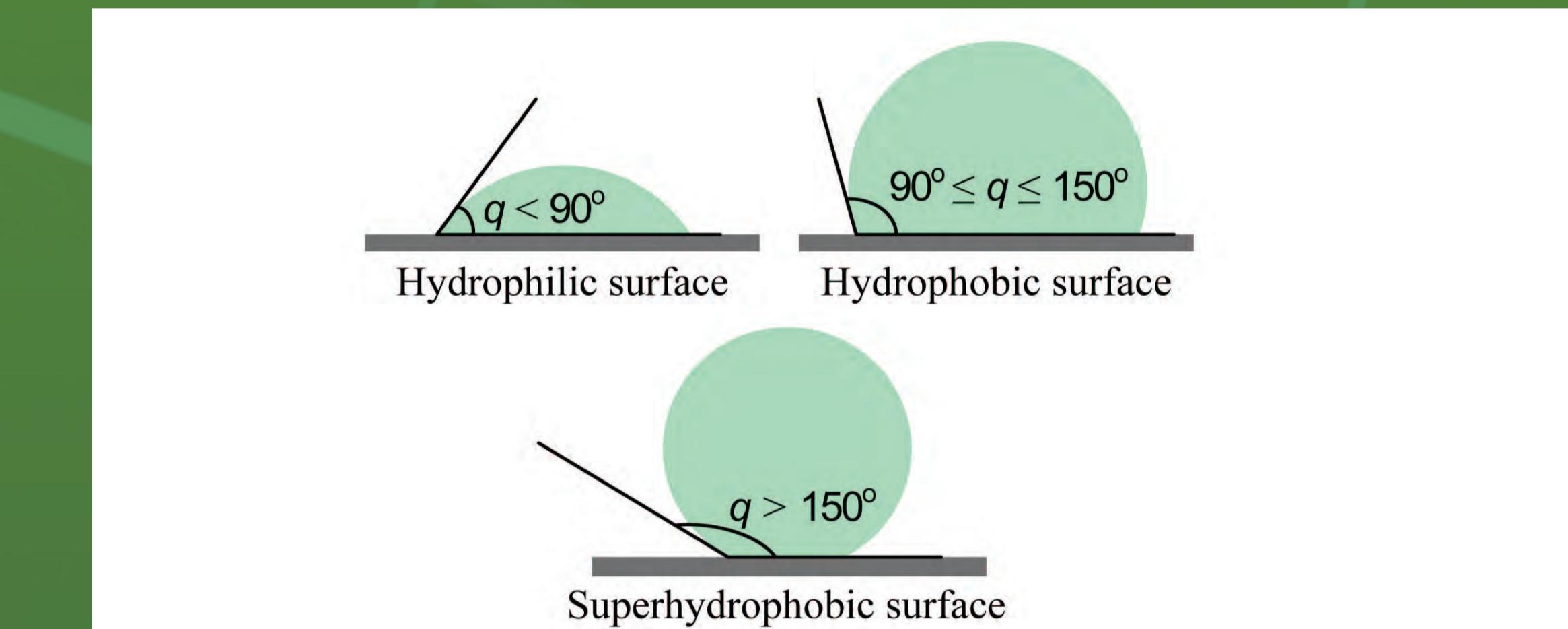


Fig.2 Surface classification

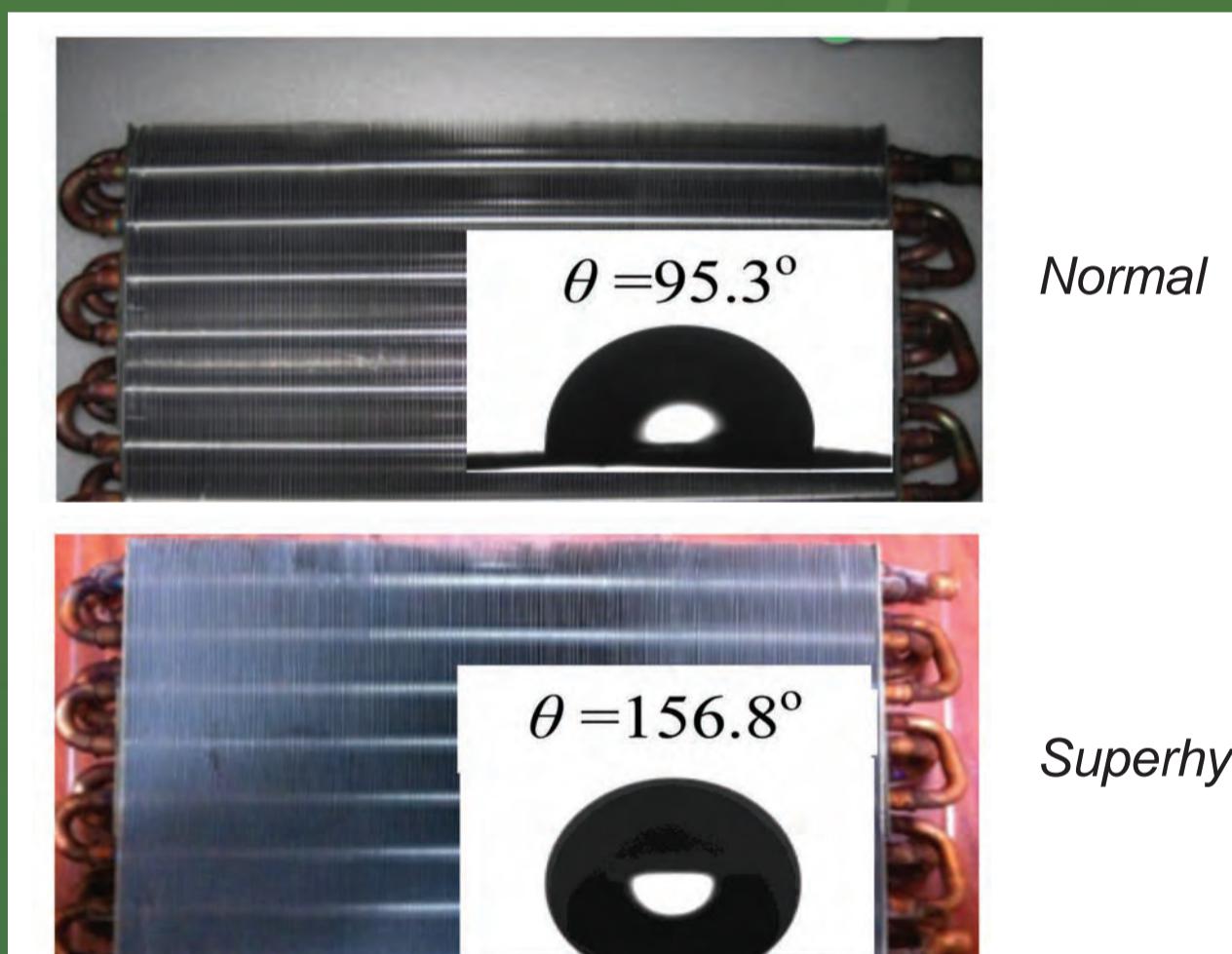


Fig.3 Superhydrophobic and normal heat exchangers

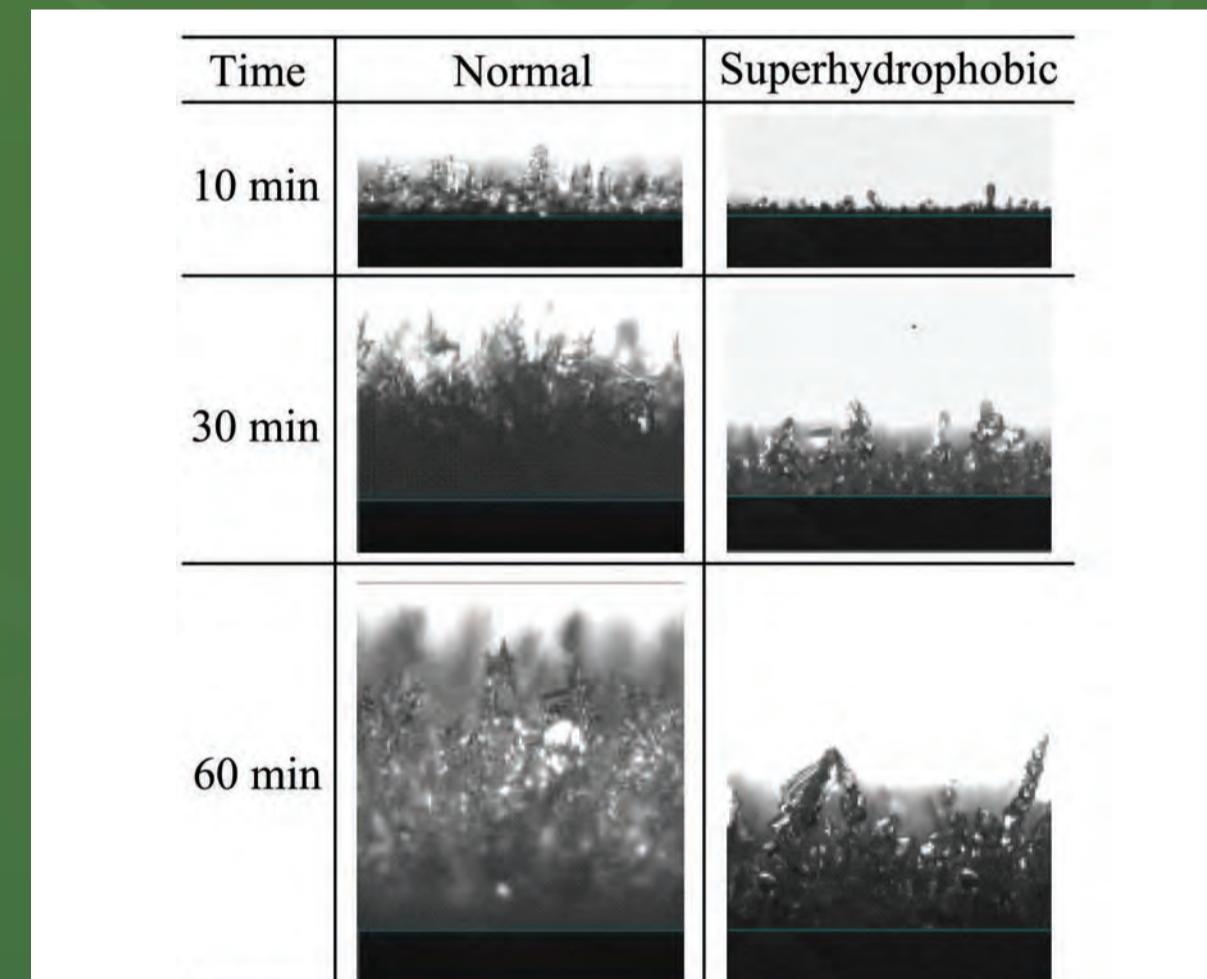


Fig.4 Efficient frost suppression

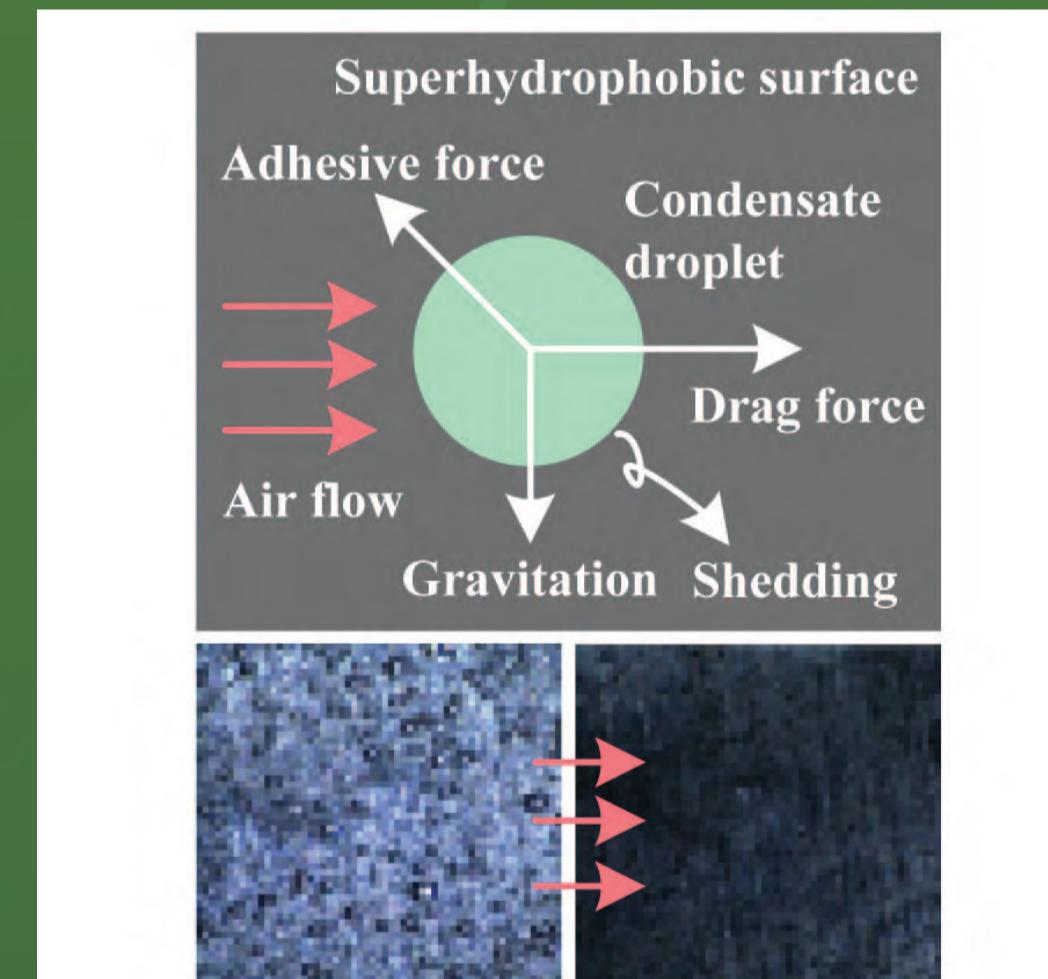


Fig.5 Schematic diagram of novel defrosting method

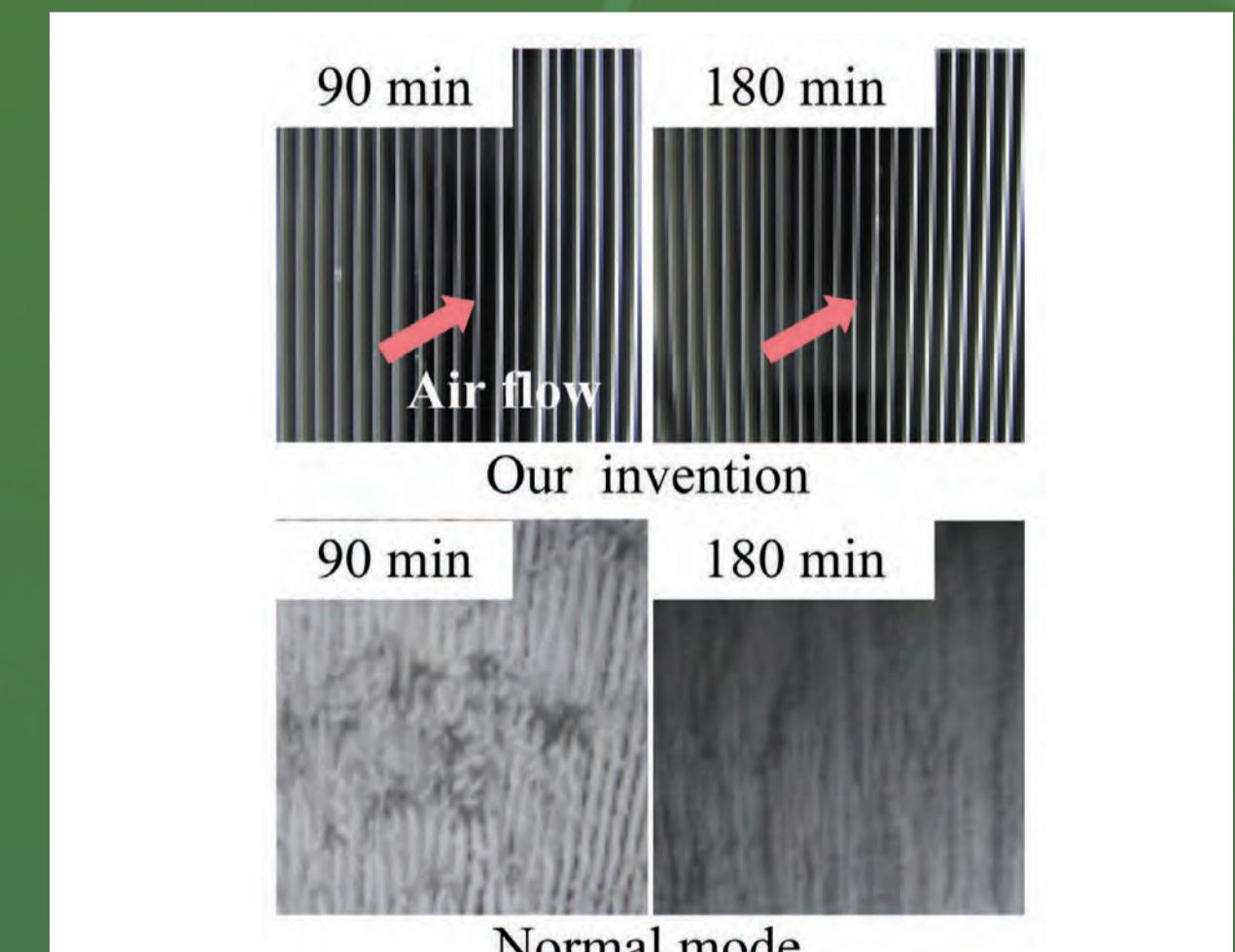


Fig.6 No frost on heat exchanger of ASHP by novel defrosting method

Special Features and Advantages

- Delaying frosting effectively on ASHP
- Avoiding performance degradation of ASHP caused by frost layer growth
- Realizing continuous heating supply
- Improving thermal comfort
- Increasing heating efficiency of ASHP by 12.1%

Applications

- Building energy efficiency
- Heating and air conditioning for buildings
- Application of ASHP new products in cooperation with heat exchanger and air conditioning companies

Intellectual Property

PRC Patent: 201410584455.2, 201410293910.3,
201310179395.1

Caractéristiques Particulières et Avantages

- Retarder efficacement la gelée sur PAC
- Empêcher la dégradation du rendement de PAC résultant de la formation de la couche de gelée
- Chauffage fourni en continu
- Améliorer le confort thermique
- Augmenter l'efficacité thermique de PAC de 12,1%

Applications

- Efficacité énergétique des bâtiments
- Chauffage et climatisation dans les bâtiments
- Application de nouveaux produits PAC en coopération avec les entreprises d'échangeur de chaleur et de climatisation

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