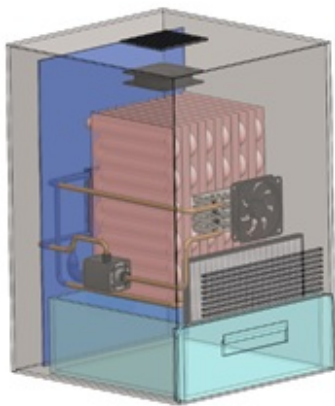


A New Hybrid Dehumidifier based on Superhydrophilic-nanostructured Composite Surface

 Energy & Environment

Others



IP Status
Patent filed



Technology Readiness
Level (TRL) ?

6

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Opportunity

Hong Kong is under subtropical climate where is hot and humid. There is a high demand of the dehumidifiers to achieve thermal comfort in indoor environment and to prevent water condensation leading to micro-organism growth such as fungi and bacteria. However, dehumidifiers consume substantial energy because compressors in dehumidifiers consume a lot of energy. A novel dehumidifier without a compressor is proposed to reduce the energy consumption of dehumidification remaining the comparable performance to tradition dehumidifiers. According to the "2018 Global and Chinese Dehumidifier Market Research Report", the global dehumidifier market size reached US\$1.549 billion and is expected to reach US\$1.986 billion in 2025. According to the "2018-2022 China Dehumidifier Industry Market Development Status and Production Data Analysis Report", it shows that in 2017, China's dehumidifier market sales were 1.49 million units and the retail scale was US\$290 million. It can be seen that mainland China in the dehumidifier industry accounted for a large proportion.

Technology

The hybrid dehumidifier mainly consists of several plate heat exchangers with the superhydrophilic-nanostructured composite surface, a thermoelectric cooler. The superhydrophilic-nanostructured composite

Follow-on
Funding

Develop
Concept

Proof
Concept

Build Value

surface can effectively absorb the water vapor in air for dehumidification while the thermoelectric cooler is an alternative of the compressors to generate cooling effect so that the dehumidification process can be accelerated. The thermoelectric cooler can generate heat during the operation and phase change materials are proposed to be used for harvesting the heat which will be employed to remove the water in the superhydrophilic-nanostructured composite surface for continuous operation of the dehumidification process. These components make a good use of energy so the hybrid dehumidifier is more energy-efficient than the conventional dehumidifier.

Advantages

- Energy-efficient: the consumption of the hybrid dehumidifier is high
- Multi-functional: the hybrid dehumidifier can function as an air cleaner
- Environmentally friendly: the hybrid dehumidifier does not use toxic substances
- Low noise: the hybrid dehumidifier does not contain any noisy mechanical component

Applications

- Dehumidification (i.e. reducing air humidity);
- Purifying indoor air

