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The role of liquid flow window in active and passive solar building design

While window glazing is extensively used in modern buildings, its weak thermal performance often leads to increased space thermal load and electricity demand. Consequently, the continuous burning of fossil fuels deteriorates our global environment, and the problems of air pollution and climate change are intensified. To cope with the green energy or zero-carbon building needs, window glazing technology has been under rapid evolution. New innovations in recent years have given window glazing a revised identity as well as a wide range of design options. This article first gives a brief overview of the recent developments in advanced window technology, particularly of the multi-glazing features and solar applications. Then the innovative concept of liquid-flow window is introduced. By connecting one cavity of a multi-pane window to a solar heat absorbing liquid-flow circuit, the absorbed solar heat at the window glasses can be readily removed by the fluid stream. The flow passage in this way can effectively lower the glass pane temperature, reduce room heat gain and therefore the air-conditioning electricity consumption. On the other hand, the liquid-flow window can function as a hot-water preheating device. The variety of physical structure and arrangements are introduced. The energy performances are presented with supporting experimental findings and numerical analysis. Finally, their application potential and direction of future research and development are discussed.

Biography

T T Chow has received his PhD from the University of Strathclyde in Scotland. He is currently an Associate Professor and Director of the Building Energy and Environmental Technology Research Unit at the City University of Hong Kong. He has 400 academic publications, including over 130 SCI journal articles and with over 3,000 Scopus citations. He has been serving as member of many journal Editorial Boards, such as the *Journal of Building Performance Simulation*. He has contributions in many reputable international conferences as Committee Member and Invited Speaker. He holds Fellow Membership in many professional institutions, such as FASHRAE and FCIBSE.

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