

Environmental Research, Technology Demonstration and Conference Project

ECF Project:	ECF 2022-83
Project Title:	Environment and Conservation Fund - Combating Hong Kong Urban Heat Island via a Biocompatible Self-Adaptive Radiative Cooling Paint
Principal Investigator:	Dr Li Weihong, Department of Mechanical Engineering, City University of Hong Kong
Total Approved Grant:	\$710,000
Duration:	1/10/2023 to 31/09/2025
Project Status/Remarks:	On-going
Project Scope:	<p>The construction of large cities represents a fundamental, inextricable change from the natural environment. Urbanisation is beneficial for improving residents' living standards and economic development as urban areas create more than 90% of global gross value added. Unfortunately, urbanisation also brings with it some negative environmental, social, and economic consequences, with urban heat islands (UHIs) being one such concern. The UHI effect refers to relatively high temperatures in urban areas than its rural counterparts. Under continuous climate changes, this trend yields two exasperating outcomes: (1) UHI intensity is increasing in most major cities, and (2) more people are enveloped by heat islands. Hence, developing effective mitigation strategies for UHI become increasingly important. This project aims to propose urban heat mitigation strategies by integrating innovative high-albedo materials and high-accuracy UHI simulation methods. It will develop a biocompatible self-adaptive radiative cooling paint, which dynamically switches from subambient cooling mode in hotter months to non-cooling mode in colder months. It will test and evaluate building- and city-scale energy savings in hot and colder months, and then build a surface energy balance model based on the local climate zone scheme to evaluate the intra-urban heat mitigation potential of self-adaptive radiative cooling paint at district and city scales. It will propose recommendations and strategies for urban heat mitigation in the context of Hong Kong's built urban areas and unbuilt Northern Metropolitan areas by utilising the proposed self-adaptive radiative cooling paint.</p>
Summary of the Findings/ Outcomes:	To be available upon completion of the project