Environmental Research, Technology Demonstration and Conference Project

ECF Project:	ECF 2021-141
Project Title:	Photocatalytic degradation of microplastics
Principal Investigator:	Professor Aleksandra Djurišić, Department of Physics, The University of Hong Kong
Total Approved Grant:	$1,306,072
Duration:	01/01/2023 to 31/12/2024
Project Status/Remarks:	On-going
Project Scope:	Microplastics (MPs) are emerging pollutants which are ubiquitous in the environment. Due to the high level of MP pollution in the Greater Bay Area (significantly higher compared to international averages), persistence in the environment and demonstrated negative impact on marine life, bioaccumulation, and multiple pathways to enter human food chain, it is critical to address this problem. Due to incomplete removal and secondary emissions via runoff from treated sludge, water treatment plants cannot eliminate MP pollution even when employing advanced treatment technologies. Photocatalysis is capable of degrading MPs to nontoxic reaction products, but improvements in the process are needed due to incomplete degradation, long processing time, and/or requirements for higher energy UV (UV C) illumination. We propose to develop effective photocatalysts for microplastics degradation under UV A (365 nm) illumination and under solar illumination. Semiconductor heterojunctions will be used to enhance the photocatalytic efficiency to achieve complete degradation of model pollutants (common MPs such as polyethylene microparticles from personal care products, polyester microfibers from synthetic textiles) and demonstrate degradation of actual environmental microplastic samples. The obtained results from the project can then be used to develop future environmental remediation strategies for green MP degradation.
Summary of the Findings/Outcomes:	To be available upon completion of the project