Environmental Research, Technology Demonstration and Conference Project

ECF Project:	ECF 2022-34
Project Title:	Environment and Conservation Fund - Convert the Coffee Grounds into Two-Dimensional Graphene Thin Film
Principal Investigator:	Dr Zhao Jiong, Department of Applied Physics, The Hong Kong Polytechnic University
Total Approved Grant:	$500,000
Duration:	1/7/2023 to 30/6/2025
Project Status/Remarks:	On-going
Project Scope:	Millions of tons of coffee grounds are produced every day in the world. Metropolitan like Hong Kong particularly generates massive coffee grounds, which mostly go to landfills as waste. To green recycle coffee grounds, here the project proposes to utilise coffee grounds as source material for the production of two-dimensional (2D) graphene films via chemical vapour deposition (CVD). The replacement of the CVD reaction sources such as methane by the coffee grounds could significantly lower the economic and environmental costs of graphene synthesis, thereby reducing the total cost of graphene-related devices/products and extending their applications. Meanwhile, the entire conversion process of coffee grounds into graphene is environment friendly, and could finally yield high-quality 2D graphene films, which are suitable for a variety of promising applications of graphene. In brief, 2D graphene will play major roles in the next-generation electronic industry, membrane industry and chemical industry. The project aims to: (a) find the green recycling routes for coffee grounds generated worldwide; (b) reduce the cost of the 2D graphene products by using coffee grounds; and (c) develop novel high-performance electronic devices based on graphene materials originating from coffee grounds.
Summary of the Findings/ Outcomes:	To be available upon completion of the project