Environmental Research, Technology Demonstration and Conference Project

ECF Project:	ECF 2018-102
Project Title:	Novel recycling of incinerated sewage sludge ash from T·Park and waste bentonite as a high-performance adsorbent for wastewater treatment
Principal Investigator:	Professor Poon Chi Sun, Department of Civil and Environmental Engineering, The Hong Kong Polytechnic University
Total Approved Grant:	$1,315,800
Duration:	1/9/2019 to 31/5/2022
Project Status/Remarks:	Completed
Project Scope:	The project aimed to – (a) develop an effective pelletisation and sintering method to transform incinerated sewage sludge ash (ISSA) and waste bentonite into a valuable granular adsorbent for wastewater treatment; (b) develop appropriate technologies to reuse the pelletised ISSA / bentonite after wastewater treatment; and (c) compare the environmental benefits and economic advantages of the newly developed technology with conventional adsorbents via life cycle assessments
Summary of the Findings/Outcomes:	Hong Kong has built the world's largest sewage sludge incineration facility (T·Park) to treat increasingly produced sewage sludge (1,100 tonnes per day at present vs 2,000 tonnes per day in 2030) in the city. Currently, the generated sewage sludge ashes are all landfilled without recycling. To reduce burden on the landfill sites and progress towards a society with more sustainable waste management, the project team aimed to develop a novel technology to maximize the use of the ISSA and waste bentonite for producing granular adsorbent for wastewater treatment. A total of three sorptive granules were produced from ISSA, waste bentonite, glass powder and/or peanut shell, which could effectively remove As, Cr, Cu and Pb from wastewaters. Meanwhile, these granules had strong mechanical strength, which could be further upcycled in construction materials without the leaching of toxic elements exceeding the regulatory limits based on the Toxicity Characteristic Leaching Procedure. The findings of this project provided environmental and economic benefits, primarily through conservation of raw materials, but also through reduced quantities of ISSA and waste bentonite sent to disposal.