Multi-functional Gel for Malodor Treatment

By

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Date: 11 August 2017 (Friday)
Time: 10:00
Venue: Room 4582 (Lifts 29-30)

Examination Committee:
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Abstract

Malodor and in particular H₂S is one of the main air pollutants affecting life quality and may cause psychological stress and psychosomatic symptoms. Hydrogen sulfide is considered as major malodor from anaerobic decomposition of organic matter containing sulfur in household and industrial wastes. They are highly toxic and exist generally in sewer systems, hence pose serious threats to surrounding environment and personal health. In addition, it is also an important source of corrosion in the drainage system. This work reports the design, characterization and use of a multifunctional gel for controlled release of biocides and metabolic inhibitors that specifically targets microorganisms responsible for H₂S generation in laboratory scale and field study in drainage system provided by the Drainage Service Department, HKSAR. This approach enabled the use of formulated multifunctional gel in contaminated storm drain and working sewer trunk with flows as high as 2 m³.min⁻¹. The H₂S level was lowered from average 3 ppm in contaminated stormwater drainage and 5 ppm in sewage system to below 0.1 ppm over a 3-month field test, and the anaerobic bacteria number was decreased by 80 % over the same period of time.