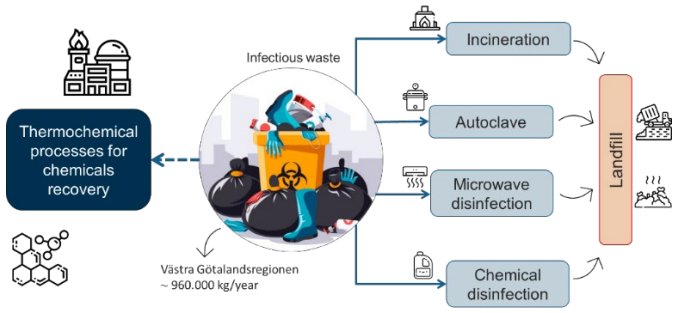
Projektförslag för kandidatarbete inom Energiteknik /Rymd-, geo- och miljövetenskap /Mekanik och Maritima vetenskaper/Kemiteknik

Recycling of medical wastes within the circular economy framework via thermochemical technologies

Background: Medical waste management represents a current challenging issue that is becoming more and more important due to the increased consumption of single-use items, which was emphasized during the covid-19 pandemic. Hazardous wastes are usually dismissed when drawing circular economy policies because of the necessity for decontamination, which leads to a negative perception in the society related to health concerns, and consequently financial impact. The most used option for the management of medical waste, is a very costly off-site treatment that requires sorting, storage, transportation, incineration, and landfilling, thus contributing to greenhouse gas emissions. Thermochemical technologies not only can provide a decontamination process for the hazardous waste, but also for recovering of chemical building blocks which may be used to produce circular materials. Therefore, it can be proposed as a sustainable treatment alternative.



Problem description and goals: The overarching goal is to contribute to the circularity of medical wastes, creating a recycled raw material for the chemical industry. This project is explorative and part of an initiative that aims to develop a process for recycling streams of medical wastes, primarily single use items, allowing the recovery of valuable building blocks that can be reintroduced into the material cycle of the chemical industry. The goal is to investigate to what extent valuable building blocks can be retrieved from this kind of polymeric waste via thermochemical technologies.

Method and Implementation: The project is focused on the development of a large-scale technology combining both theoretical and experimental methods to derive expected recycling rates, the economy of the process, and allows comparison with alternative technologies. The project contains explorative practical experiments at laboratory scale based on a selected material, process calculation and an analysis of alternative techniques. The experimental work will not be carried out by using contaminated medical wastes. Raw clean materials will be used instead.

Special prerequisites: Good co-operation skills and an interdisciplinary interest are important in this project. Skills in laboratory experience, chemical reaction technology, thermodynamics and heat transport will be desirable within the group.

Possible target group: Many different backgrounds are possible. Preferably the group could consist of at least 2 students with a chemistry background (K, Kf, Bt) and at least 2 students with a mechanical background (M). Other backgrounds (F, Z) may also be relevant.

Group size: 1 Group. Min. 4, max. 6

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*Note: The experimental work will not be carried out by using contaminated medical wastes. Raw clean materials will be used instead.

Also, please note that this report can be written in Swedish, and if anyone from TKTFY is in the group the report must be written in Swedish. OBS: Rapporten kan skrivas på svenska och om någon från TKTFY är med i gruppen så skall rapporten skrivas på svenska