

RoKaB - Raw material potential analysis for the carbonization of contaminated residual biomass

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Project partners:

- Live Energies GmbH
- Federal Institute for Materials Research and Testing (BAM)
- Institute for Technical Chemistry (ITC), Karlsruhe Institute of Technology (KIT)

Contamination of (agricultural) soils with per- and polyfluoroalkyl substances (PFAS) poses a major challenge to the usability of farmland and the purity of groundwater.

One solution is to decontaminate the affected soils in the long-term using suitable plants that absorb PFAS but do not concentrate it in their fruit (e.g. corn). The contaminated residual biomass produced during harvesting is then carbonised in order to break down the PFAS and produce biochar.

As part of several preliminary studies conducted by Live Energies GmbH, initial investigations into the degradation of PFAS by carbonisation were carried out. While a reduction in PFAS in the solid material was demonstrated, the gas phase emitted during the process was not analysed for fluorine. This feasibility study therefore aims to determine the fate of fluorine from PFAS in plants, in the gaseous and solid products, preferably above the respective detection limits. To this purpose, model biomass is treated under various reaction conditions, all product phases are analysed in detail, and, for example, the fluorine-related degradation rate is determined.

A vertical tube furnace capable of operating at temperatures of up to 1,100 °C is used at KIT-ITC for carbonisation testing. This furnace contains a fixed-bed reactor made of quartz glass tube, through which a gas stream flows from top to bottom. The exhaust gas emerging from the furnace can be sampled via a T-piece and analysed for fluorine by BAM.

Link to Live Energies GmbH:

<https://www.live-energies.com/en/projects/carbonization/#enpfaslink>

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