

One and two-stage test rigs for thermo-catalytic pyrolysis

Description/Parameters

The one-stage test rig consists of a glass reactor vessel with all other parts including condenser, joints condensate receiving flask also made of glass. A vertical muffle furnace equipped with a temperature controller is employed for reactor heating.

For the two-stage rig, along with the primary reactor that is heated with the vertical muffle furnace, an additional glass tube is used as a secondary reactor for which a circular heating jacket is employed as a heat source.

For both setups, the condensate receiving flask is placed in a cold trap for which dry ice is used as cooling medium. The gases produced during pyrolysis are collected in Tedlar[®] gas sampling bags. Both liquid and gaseous products are analysed by chromatography.

Utilization/Services

One and two-stage test rigs are primarily used for valorisation of waste polymeric materials by thermal and thermo-catalytic treatment.

- Temperature range 300 550 °C.
- Material feed up to 10 g.



Schematic diagram of the experimental setups: one-stage (top); two-stage (bottom) [1]

[1] A. Inayat, A. Inayat, W. Schwieger, K. Klemencova, P. Lestinsky, Chemical recycling of waste polypropylene via thermo-catalytic pyrolysis over HZSM-5 catalysts, Chem. Eng. Technol. (2023). https://doi.org/10.1002/ceat.202200529.

