

Internally Heated Screw Pyrolysis Reactor (IHSPR) heat transfer performance study

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ABSTRACT

1.5 billion end-of-life tyres (ELT) were discarded globally each year and pyrolysis is considered the best solution to convert the ELT into valuable high energy-density products. Among all pyrolysis technologies, screw reactor is favourable. However, conventional screw reactor risks plugging issue due to its lacklustre heat transfer performance. An internally heated screw pyrolysis reactor (IHSPR) was developed by local renewable energy industry, which serves as the research subject for heat transfer performance study of this particular paper. Zero-load heating test (ZLHT) was first carried out to obtain the operational parameters of the reactor, followed by the one dimensional steady-state heat transfer analysis carried out using SolidWorks Flow Simulation 2016. Experiments with feed rate manipulations and pyrolysis products analyses were conducted last to conclude the study.

KEYWORDS:

Chemical reactors; Pyrolysis; Screws