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Authors: Raslan A. Alenezi, Fahad M. Al-Fadhli

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Thermal degradation kinetics of waste printed circuit boards

Raslan A. Alenezi^a and Fahad M. Al-Fadhli^b

^a Department of Chemical Engineering, College of Technological Studies, Public Authority for Applied Education and Training, PO. Box 42325, Shuwaikh 70654, Kuwait. Email: ra.alenezi@paaet.edu.kw

^b Department of Chemical Engineering, College of Engineering & Petroleum, Kuwait University. P.O. Box 5969, Safat 13060, Kuwait
Email: Alfadhli.f@ku.edu.kw

Highlights

- A thermal degradation of PCBs was investigated using non-isothermal TGA.
- Different kinetic models were tested on the TGA polymers degradation data.
- These models did not fit the TGA degradation data due to the complexity of PCBs.
- An innovative kinetic model has been developed to represent PCBs degradation data.
- Results will be useful for partially recycling of monomers or incineration systems.

ABSTRACT

A large quantity of electronic waste, (e-waste) is generated due to a short lifespan of communication and other devices and introduction of the newly smart gadgets making limited use and generating e-waste at an alarming rate. To resolve this emerging e-waste problem, one has to thermally depolymerise in an inert atmosphere. The thermal degradation of Printed Circuit Boards PCBs was investigated using a simultaneous Thermogravimetric analyzer in the temperature range of 350 –1200 K. Pyrolysis experiments were carried out on PCB samples at six different heating rates of 5, 10, 20, 30, 40 and 50 K/min. A unique model was developed in this study, it

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