

[Analytical pyrolysis of waste paper laminated phenolic-printed circuit board \(PLP-PCB\)](#)

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Abstract:

The pyrolysis of a paper laminated phenolic-printed circuit board (PLP-PCB) was investigated. Kinetic analysis revealed the pyrolysis of PLP-PCB to be composed of a series reaction distinguished by the DTG curve and four activation energy regions: (1) vaporization of phosphorous flame retardants (<280°C), (2) pyrolysis of laminated paper and tetrabromo bisphenol A (TBBA) (280–370°C), (3) pyrolysis of phenolic resin (370–500°C), and (4) stabilization of the char intermediate (>500°C). The evolved gas analysis-mass spectrometry (EGA-MS) and heart cut EGA-gas chromatography (GC)/MS results showed that large amounts of phosphate flame retardants which can be reused as additives were recovered below 280°C. Because the paper and TBBA had almost the same decomposition temperature regions, the pyrolyzates of laminated paper, mainly levoglucosan, were produced together with the pyrolyzates of TBBA, mainly brominated bisphenol between 280 and 370°C. Important chemical feedstock, such as phenol, cresols and other alkylated phenols were produced from the decomposition of phenol resin between 370 and 500°C, and aromatic compounds were emitted as the byproducts of char stabilization reaction at temperatures higher than 500°C.

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Frontier Labs products used:

Multi-Shot Pyrolyzer, UADTM-2.5N