

## A review on printed circuit board recycling technology

### Abstract

From the use of renewable resources and environmental protection viewpoints, recycling of waste printed circuit boards (PCBs) receives wide concerns as the amounts of scrap PCBs increases dramatically. However, treatment for waste PCBs is a challenge due to the fact that PCBs are diverse and complex in terms of materials and components makeup as well as the original equipment's manufacturing processes. Therefore, it is urgent to develop a proper recycle technology for waste PCBs. Several recycle technologies were review in this paper. From the review, it can be said that, PCBs recycling process usually includes three process which is pretreatment, physical recycling, and chemical recycling. PCBs recycling generally start from the pretreatment stage, which include disassembly of the reusable and toxic parts. After pretreatment process, PCBs are treated using physical recycling process. Physical recycling involves a preliminary step were size reduction of the waste is performed followed by a step in which metallic and non-metallic fractions are separated and collected for further management. In the end, materials are finally recovered after chemical recycling process. In this review, chemical recycling consists of pyrolysis process and gasification process. While, metal fraction can be treated by pyrometallurgical, hydrometallurgical, or biotechnological process.