



Environmental Management of Waste Electrical and Electronic Equipment

2021, Pages 163-184

9 - Biological treatment, recovery, and recycling of metals from waste printed circuit boards

Shivani Goswami¹, Anamika Kushwaha², Lalit Goswami³, Narendra Singh⁴, Uday Bhan⁵, Achlesh Daverey⁶, Chaudhery Mustansar Hussain^{7, 8}

¹ Department of Biotechnology, Brahmanand College, Chhatrapati Shahu Ji Maharaj University, Kanpur, Uttar Pradesh, India

² Department of Biotechnology, Motilal Nehru National Institute of Technology Allahabad, Prayagraj, Uttar Pradesh, India

³ Center for the Environment, Indian Institute of Technology Guwahati, Guwahati, Assam, India

⁴ Department of Chemical Engineering, Indian Institute of Technology Tirupati, Tirupati, Andhra Pradesh, India

⁵ Department of Petroleum Engineering & Earth Sciences, University of Petroleum & Energy Studies, Dehradun, Uttarakhand, India

⁶ School of Environment and Natural Resources, Doon University, Dehradun, Uttarakhand, India

⁷ Department of Chemistry and EVSC, New Jersey Institute of Technology, Newark, NJ, United States

⁸ Department of Chemistry and Environmental Science, New Jersey Institute of Technology, Newark, NJ, United States

Available online 16 April 2021, Version of Record 16 April 2021.

Show less ^

☰ Outline | 🔗 Share 🗣️ Cite

<https://doi.org/10.1016/B978-0-12-822474-8.00009-X>

[Get rights and content](#)

Abstract

The application of end-of-life strategies, especially in waste electrical and electronic equipment (WEEE) is becoming extremely relevant for sustainable development in manufacturing processes and circular economy models. Owing to this, printed circuit boards (PCBs) are important components embedded in WEEE. This chapter deals with the biorecovery and waste valorization describing innovative treatment, recovery, and recycling technologies for bringing enormous economic benefits. Development and modification of bioinspired techniques will provide a high-efficient way to recover metals selectivity from PCB waste. Mechanistic insights and viable application of bioleaching, biomineralization, bioelectrochemical, and biosorption systems for simultaneously enhancing the critical metals recovery and energy-efficiency are also