

Sustainable Gold Recovery: Transforming Hazardous Waste into Valuable Resources - A Comprehensive Study

Mr. Dinesh Kulkarni, Moog India Technology Center, Bengaluru Ms. Amitha Kulkarni, CEO, JSS Advanced Jewellery Design Technology Centre - 3DJewels, Bengaluru



This study makes an attempt to explore the challenges and opportunities in extracting valuable metals from electronic waste, with a particular focus on gold. By synthesizing information from the existing literature, authors highlighted the growing environmental problem of electronic waste, which is expected to increase at a 3-5% annual rate, three times faster than other waste streams. Electronic waste is classified as an 'urban mine' because it contains several precious metals, including gold, silver, and copper, that can be recovered and reused as secondary raw materials. The study outlines the process of sustainable gold extraction from electronic waste, which includes collection, sorting, shredding, separation of components, metal recovery, and plastic recovery; and further emphasizes its importance which provides economic, environmental, and societal benefits while aligning with the global sustainability goals. The study lists several advantages of environmentally friendly gold extraction, such as job creation, reduced toxic waste, and the promotion of responsible recycling practices. It further highlights the challenges associated with e-waste recycling. Following the challenges in waste recycling, this study signifies the importance of proper handling of toxic substances found in electronic devices, like mercury and lead, to minimize the potential for environmental contamination and human health risks. Lastly, it discusses policy implications in the line of sustainable gold extraction such as incentives and subsidies, tax breaks for recyclers, research and development grants, mandatory recycling standards, public awareness campaigns, and domestic and international collaboration to act towards safeguarding the environment from hazardous chemicals and hence contribute to a more sustainable future.