

## SUSTAINABLE ALTERNATIVES FOR HAZARDOUS WASTE MANAGEMENT

Tania VRÂNCEANU, Elena-Diana COMĂNIȚĂ UNGUREANU, Ersilia  
LAZĂR COȘBUC, Petronela COZMA, Daniela Ionela TUDORACHE,  
Dan-Alexandru GAVRILESCU, Maria GAVRILESCU\*

**Abstract.** *In order to ensure a sustainable economic and social development and maintain the quality of the environment, adequate waste management and conservation of natural resources are required. It is therefore necessary to apply an integrated waste reprocessing and recycling system, based on specific technologies, which facilitate, in the first stage, the recovery of valuable waste materials and, subsequently, the recovery of all materials and energy. Among the waste generated, a significant quantity is classified as hazardous waste. This paper has as main objective the analysis of waste management alternatives with an emphasis on hazardous waste management. Small and large generators of hazardous waste and environmental impact are considered as well as options for reducing hazardous waste quantities. Following an algorithm proposed in literatureh, the decision of appropriate methods of treatment and disposal of hazardous waste is made based on three main factors: physical state of hazardous waste, hazard criterion, composition criterion. On this basis, specific schemes for hazardous waste processing and disposal were established. A special attention was paid to alternatives for the treatment and disposal of hazardous waste in the form of accumulators and spent batteries and recovery of critical metals as secondary critical metals.*

**Keywords:** batteries, hazardous waste, management alternatives, waste generation

<https://doi.org/10.56082/annalsarsciphyschem.2020.2.93>

### 1. Introduction

Human civilization is based on production and consumption, from which waste is generated, which is a huge loss of resources both in terms of materials and

---

\* Corresponding author: mgav@tuiasi.ro

”Gheorghe Asachi” Technical University of Iasi, ”Cristofor Simionescu” Faculty of Chemical Engineering and Environmental Protection, 73 Prof. D. Mangeron Blvd., 700050, Iasi, Romania

---