Metals recovery from solid wastes as a tool for sustainability improvement.

Fernando J. S. Oliveira*

Federal University of Rio De Janeiro, Brazil

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Waste management, despite its importance for maintaining quality of the environment and its potential to damage human health, has been neglected by various industries, processes and countries, especially those still under development.

Despite the many technological changes, cultural globalization and markets, waste management is still viewed as dirty and unhealthy secondary work, which is done by people with little or no qualifications, who receive low remuneration, and without risk management and proper guidance. This narrow-minded model is wrong and damaging to the continuous improvement of sustainability. This discourages the training and specialization of human resources in this area of knowledge. Unfortunately this misguided view of handling it extends to the entire waste management chain which is often labeled as wasteful or worthless.

Developing and especially developed countries are increased their generation and diversity of solid wastes that can contain many types of chemicals at different levels of complexity and toxicity with varying concentrations. Heavy metals and some metalloids are among those substances that require adequate management. This Editorial focuses on these types of solid wastes.

Metals and metalloids make up a broad class of chemicals found in many products for example electrical and electronics. Although less widespread to all segments of society, metals and metalloids are embedded in the various electronic devices, such as touch screens in imaging and communication equipment (whose lifespan is becoming shorter each day) and in the circuits of many innovative applications that increasingly play a significant role in daily life and in global demands for efficient and cost-effective solutions.

The literature shows that, in addition to consumers, various industries of chemical processes, especially metallurgical, and power generation from fossil fuels produce a wide range of metal and metalloid waste including, electrical and electronic waste (e-waste), used lubricating oils, spent catalysts, abrasives for blasting metal surfaces, and sludge from the treatment of some types of liquid or gaseous effluents. In addition to this complex scenario, it is difficult to obtain the raw materials, because the deposits contain finite quantities of the substances of interest, high amounts of tailings, conflicts due to the intended land uses, which can still destroy the original landscapes. In some cases, this problem is aggravated, as is the case with rare earth elements that - although they are very abundant in the earth's crust - require sophisticated and expensive techniques for concentration and viable production on an industrial scale.

The data shows that the generation of waste containing heavy metals is high worldwide [1]. It is estimated that the United States of America leads the countries that produce e-waste. In 2016, the United States Environmental Protection Agency reported an estimated 3.36 million tons of e-waste was generated in the US in 2014 [2]. In addition, the mass generation of this type of waste is increasing [3]. In developing countries, this situation is no different. Recently, the Brazilian Association of Electrical and Electronics Industry reported that Brazil is the Latin America country that generates the most e-waste, with approximately 1.5 million tons per year [4]. Within this context, research and development of processes and products less intensive in the use of metals is justified, as well as the search for sustainable alternatives for the recovery of metals and metalloids of interest in solid waste independent of their source of generation - urban industrial, civil construction, and demolition - as well as human or animal healthcare services.

To improve the sustainability of productive processes, there is no alternative but to use best practices and inter and multidisciplinary knowledge to manage human and natural resources, as well as excellence in the sustainable management of all materials. We recognize the opening of this new channel of communication "The Journal of Environmental Waste Management and Recycling" as a relevant opportunity for a scientific approach to this real and contemporary problem. Finally, we congratulate all the collaborators and join this series of scientists, engineers, and managers, regardless of their discipline, involved in scientific, technical, and other issues related to solid waste management, who are determined to achieve the technological development in a sustainable way, and thus, to meet the basic and environmental needs of current and future generations. Full success and prosperity to all of us.

References

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***Correspondence to:**

Fernando J. S. Oliveira
Federal University of Rio de Janeiro, Brazil
Tel: +55 21 32248140; + 55 21 994760268
E-mail: f.oliveira@petrobras.com.br