

Science for Environment Policy

Call for efforts to improve metal recycling

Vast resources are required to extract speciality and difficult-to-recycle metals that are often only used once before disposal. Researchers argue in a new analysis that more must be done to improve metal recycling rates in order to secure our material needs for the future.

In the past, metal products were typically made of fairly common materials. However, today, a product that is made from metal may include a wide range of rare metals. Modern electronic devices and other high-tech products, which often have short life spans, use many speciality metals in only small amounts. This poses a challenge for recycling in terms of economies of scale for individual metals. It is usually more efficient to recycle metals in alloy form, rather than in elemental form, which explains the importance of grade-specific alloy sorting and recycling. This is particularly true for aluminium, which is very intolerant to any impurities.

New recycling technologies – which are improving – are one means of addressing current low metal recycling rates. However, the researchers suggest that modern recycling technologies alone will not be sufficient. They say that efforts to increase the proportion of metal that is recycled should also focus on improving policies to promote metal collection and sorting, and should encourage product designers to take recycling more seriously during the design process. In many cases, products could be designed for easier disassembly of the metal-rich components without any noticeable reduction in performance.

Between 25% and 40% of waste from electrical and electronic equipment (WEEE) is recycled in the EU. Legislation favours steel and base metals, such as iron, copper and zinc, which are relatively easy to recover compared to some of the speciality metals contained in electronics. With improved separation and disassembly of electronic devices prior to processing, it is thought that substantially more metal could be recovered from WEEE.

The researchers point to the potential of an international division of labour in order to increase the value extracted from collected WEEE. As an example, some computers collected in Peru are currently dismantled in Peru, and some of the separated printed circuit boards are sent to Germany for advanced smelting.

Overall, the researchers regard collection as a key mechanism for improving metal recycling. This is particularly crucial for metals used in small quantities, within highly mixed products, rather than for iron, copper or lead which are more easily identified. As modern products often use a vast range of metals the researchers also call for further investigation into transformative technologies which could optimise metal recycling.



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