

Development of a Specific Sorting Process for Recycling of Complex EoL Product – the Case of Electronics

Modern electronic devices contain a large variety of different materials. Some of these are of high market value or can be considered critical from an ecological, economic and social point of view, making their recovery particularly important. The increase in complexity and the continuing miniaturisation of components present new challenges for recycling.

Sorting of materials is the first stage for recovering them via specific technologies, such as metallurgical treatments or the regranulation of plastics. Up to now, sorting processes have mainly been using a fixed sequence of process steps. As a novel approach, a highly flexible sorting plant based on modules is used to address the need for individual separation and sorting depending on input stream. This sorting plant allows the variation of process sequences in terms of order, skipping and repetition of individual process steps. The modules include classification and sorting technologies based on physical principles, but also the use of NIR, RGB and inductive sensors as part of a multi-sensor system. Enriching recyclable materials in certain fractions and discharging pollutants are among the main objectives. Using the complex problem of the separation and sorting of used smartphones as an example, the development of such an individual process from opening the devices to valuable fractions will be demonstrated. Here, the use of electronics – especially in sensor-based sorting and process monitoring – should be seen as an opportunity. By the highly flexible configuration of the sorting process to the specific input, the process can be adapted to the individual sorting target.