



Dusts, a source of valuables?

John Bachér, VTT Technical Research Centre of Finland Ltd
Sini Eskonniemi, Kuusakoski Oy

Background and objectives

Current recycling of WEEE composes of several stages in which materials are separated from each other to produce feeds for raw materials industry. During the mechanical treatment, fractions that are not further recovered are also produced. One of these fractions are the valuable dusts from different locations of the mechanical treatment chain.

The aim of this study was:

- Characterize dusts from mechanical treatment to identify characteristics that can be taken into account in the further treatment.
- Develop and apply possible treatment methods to the dusts in order to recover valuable materials which are today lost



Figure 1. Dust from mechanical treatment

Materials and methods

Three dust samples from low grade printed circuit board treatment was received from Kuusakoski Oy.

Characterization analysis (XRF, TOC, particle size) was carried out to determine the chemical composition and physical properties.

Treatment studies focused on metals and organics separation by means of mechanical processing on a composed sample. Additional hydrometallurgical treatment will be carried out on dust samples.

Results

Characterization studies revealed heterogenic and complex nature of dusts which vary in composition and particle size depending on the origin of dust in the process.

By combining sieving and flotation, metals could be enriched with an enrichment ratio between 1.1 and 1.25. Highest enrichment ratio was detected with gold. Around 60 % of TOC was separated by primary sieving to an overflow fraction.

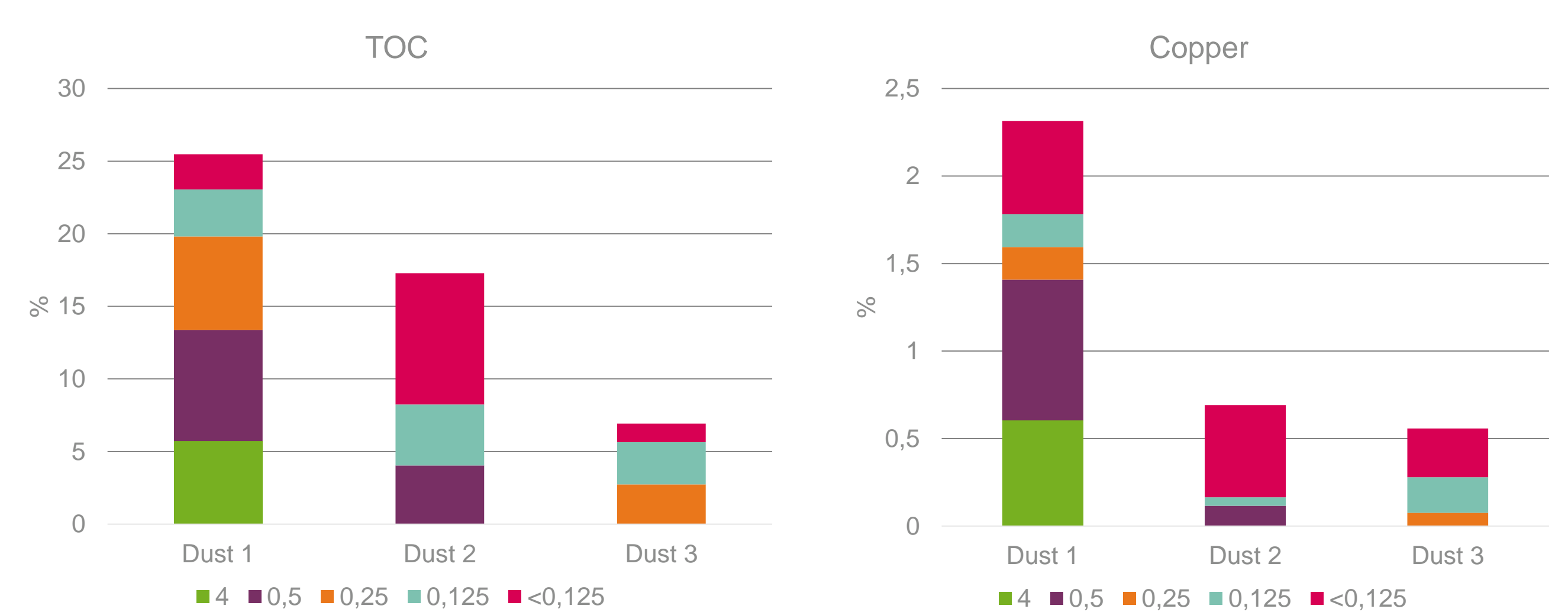


Figure 2. TOC and copper distribution in three dust samples.

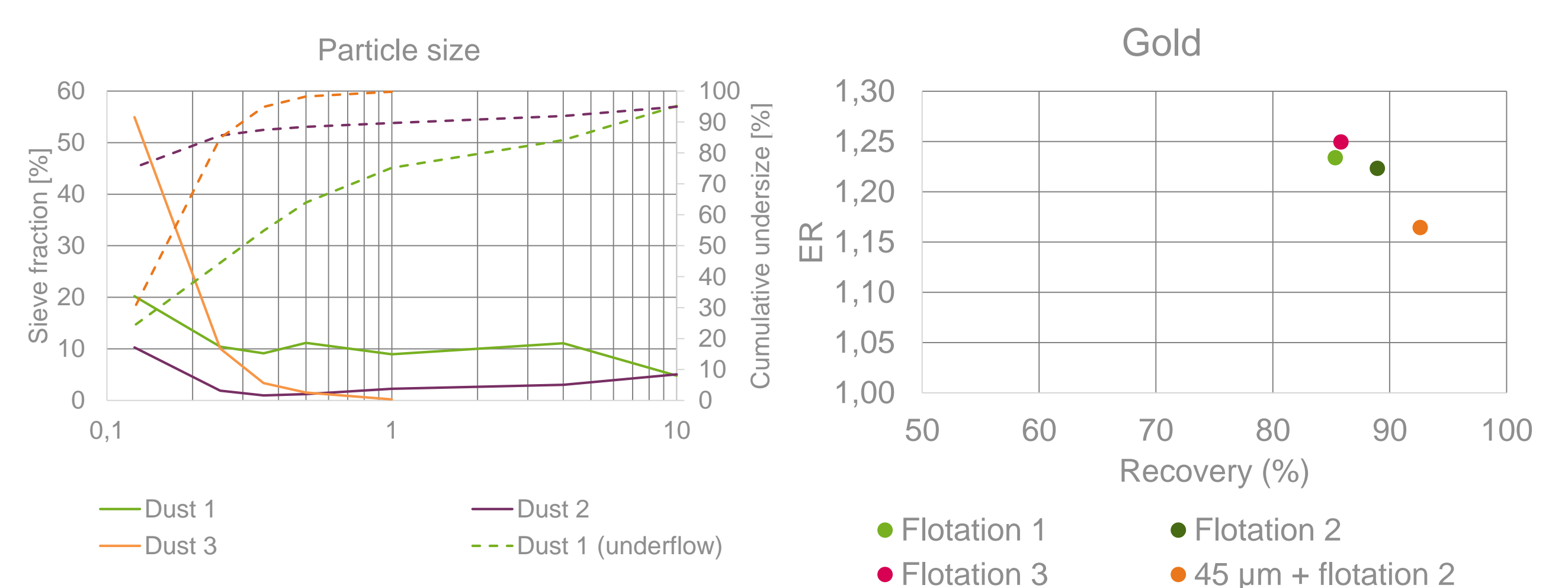


Figure 3. Dust particle size distribution and gold behavior in flotation.

Conclusion

Dusts from mechanical treatment of WEEE are heterogeneous and variable with high metals and organics content. Mechanical treatment trials were able to separate harmful substances and enrich metals with around 90 % recovery.