INNOVATIVE RECYCLING OF POLYMETALLIC EOL-PRODUCTS - CHALLENGES AT THE INTERFACE OF THE PROCESS CHAIN

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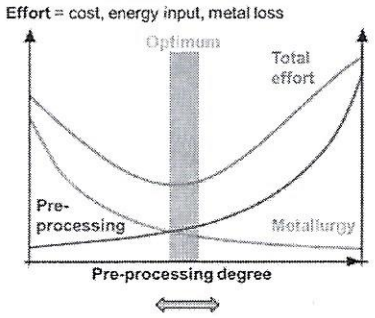
Due to the increasing complexity of modern secondary raw materials and the limited cycle guidance in the metallurgical aggregates used, innovative metal recycling can only be achieved by multi-metal approaches. The current challenges for a meaningful design of suitable process routes are manifold and interdisciplinary. Against the background of a long-term securing of the raw material basis for high-tech products, current research work focuses not only on bulk metals such as aluminum, copper, lead and zinc, but also on economically strategic metals such as cobalt, tantalum, tungsten, etc.



Due to the close interlinking, efficiency potentials can be found, especially at the interface between pre-processing and metallurgy. For example, a mechanical treatment process that is optimized from a scientific-technical point of view and is not adapted to the requirements of the subsequent metallurgy can drastically reduce its efficiency. The aim here is to determine the techno-economically sensible processing depth and thus the optimum for both consecutive process steps.

The starting point for the contribution presented here to the optimization of the recycling route for complex waste streams is the idea of a resource-efficient circular economy. The chances and the difficulties of an intensified cooperation at the interface pre-processing - metallurgy are worked out and qualitatively clarified by the example of Li-Ion battery scrap. It will be shown that interface optimization can only be achieved if more communication takes place between the two fields of technology. Here the more flexible system must always adapt to the upstream/ downstream unit.

Keywords: circular economy, recycling, pre-processing, metallurgy, interface optimization.