

Automated Disassembly of Lithium-Ion-Batteries

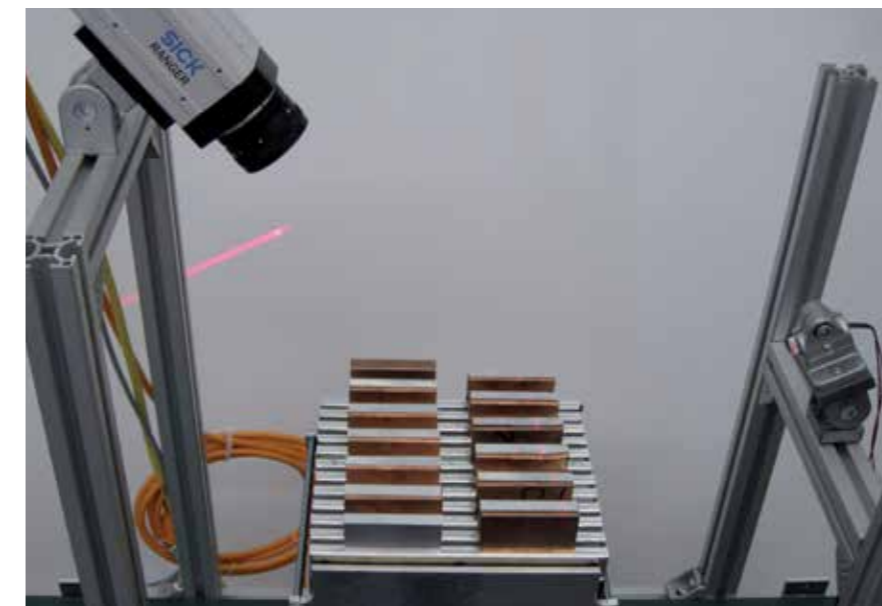
The research in this field deals with the three key areas, resource efficiency of production system, sensor-guided robotics and the composition of modular automated systems. In this context, the collaborative research project "Process for the recycling of large lithium-ion-batteries" has been launched. This project on Electromobility is funded by the state of NRW and the European Union, in order to develop an automated system for the disassembly of lithium-ion-batteries in automotive.

Today the disassembly of these batteries, taking the various parts apart, is executed manually or by shredder and then processed pyro- or hydrometallurgically. Due to the increasing number of electric and hybrid vehicles and the related rising number of batteries the automation of disassembly becomes essential. The challenges in the disassembly of lithium-ion-batteries lie in their variety, the unknown condition at the end-of-life and the highly reactive and hazardous materials in the batteries. ZESS, activities are presently focused on the recognition of the shapes of battery variants. The existing automated disassembly plants in the area of electric scrap are product-specific. The precondi-

tion for the success of automated disassembly of lithium-ion-batteries is a highly flexible system which is adaptable. In order to gain the flexibility the automated disassembly processes are modularized. A disassembly cell comprises e.g. the modules for cutting, identification, control and further sub modules. All modules are connected to the control module. This controls the cutting module with the information of disassembly database.

- The focal points in the automated disassembly of lithium-ion-batteries are:
- The development of a disassembly database for existing lithium-ion-batteries,
- Analysis and assessment of the degree of automation for each disassembling step,
- An automated tool allocation for cutting on the robot based on the identified battery variant

An important step in the project is the integration of the identification system with a KUKA portal robot and milling tools. The future task is to develop a method for the disassembly of variant products deduced from the results of the project.



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