Challenges for Recycling of Li-Ion HEV Batteries:
- substitution of cobalt by less valuable metals compromises economic efficiency of recycling processes
- adjustment of existing recycling processes to future electrode materials
- backflow of spent batteries will increase drastically, i.e. current recycling capacities have to be increased

Motivation and Target:
- spent batteries contain high valuable secondary raw materials
- recycling is prescribed by EU Battery Directive
- recovery of all valuable materials including lithium necessary

Recycling of Li-Ion HEV Batteries

Hydrometallurgical Route
- conditioning of spent Li-ion batteries
- electrode material
  - leaching with solvent
  - precipitation of Li$_2$CO$_3$ (99.9%)
  - residues
  - wastewater, metals, salts

Pyrometallurgical Route
- high temperature processing (EAF)
  - Li concentrate
  - metal alloy
  - faster process
  - higher productivity
  - limited selectivity
  - higher energy use

Long-time Experience in Battery Recycling at IME:
- development of battery recycling processes for ZnC, Alkaline, NiCd, NiMh and Li-Ion
- proven pyrometallurgical processing for concept of portable consumer-type Li-Ion batteries

In March 2008 the IME received the „Kaiserpfalz-Award of Metallurgy 2008“ for its research works in battery recycling!

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