



Konstruktion einer leichtbaugerechten Starterbatterie

This talk will explore an optimised concept for a starter battery. This patent pending conceptual design involved the application of LiFePO₄ cells in a lightweight design. We focused on the design optimisation of the case and estimated manufacturing costs, giving key consideration to weight and package reduction as well as crash characteristics. For economic effectiveness, the battery is designed in a modular way and could replace existing battery solutions. A further advantage of the lightweight design is the longer life expectancy than current lead-based starter batteries. Furthermore, the final case design has snap fits to enable easy recycling, like cell replacements, and can be made of recyclates.

The base reference was the BMW 2016 X5 Hybrid and its starter lightning ignition batteries. We gathered requirements and barriers to generate light weight opportunities to improve existing solutions. With respect to cost and manufacturing issues as well as standards we challenged our concept. Besides cooling and assembly advantages the concept offers superior mechanical properties which can also be used for HV batteries.

The outcome of the project had three major results. Firstly, the technology change from lead to lithium iron phosphate enables a lighter and smaller battery system. We derived the amount of cells needed and their pack-tight assembly. Secondly and focus of this talk, the optimised conceptual design for the modular battery case with a lightweight design via injection moulding improving elements such as weight, packaging, and manufacturing cost. The third outcome was the cost evaluation of the concept to verify the economical adaption of the lightweight design. We estimated the lightweight cost, which ranges depending on the production volume from 16 to 23 €/kg for our lithium iron phosphate starter battery, saving nearly 33 kg from conventional lead-based batteries and use 10 L less packaging and tripling the life expectancy.