AMAP
Advanced Metals and Processes

Invitation to the 106. AMAP Colloquium

Presentation by

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Cost-Effective and Sustainable Lightweight Construction with Aluminum: Potential Applications in Electric Drive Housings and Hydrogen Valves

on Thursday, ***July 16th, 2026 at 4.00 pm***
with subsequent discussion at AMAP

All interested persons are sincerely invited to AMAP.
Snacks and refreshments will be available.

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Cost-Effective and Sustainable Leightweight Construction with Aluminum: Potential Applications in Electric Drive Housings and Hydrogen Valve

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Abstract

Complex cast housings – such as those for electric powertrains, with integrated gear-boxes and motors, as well as a wide variety of attached components – are traditio-nally manufactured from aluminium alloys. In the InDrutec-E project, founded by the Federal Ministery for Economic Affairs and Climate Action (BMWK), various measures were developed, investigated and demonstred using the example of a practical trans-mission cover for an electric drive axle.

By increasing the proportion of recycled aluminum, it was possible to reduce the car-bon footprint during the manufacturing, operational and recycling phases. Combined with an optimized design and the use of high-strength aluminum or magnesium al-loys, metal requirements and weight were significantly reduced. As result, the weight of the aluminum variant was reduced by 34% compared tot he aluminum reference component, while maintaining the same functionality. A production-ready mold was fabricated, die-cast components were produced, and they were tested for functional performance.

In another research project funded by the BMWK, AluScal, the DLR, together with in-dustry partners, has developed a lightweight alternative to stainless steel for hydro-gen valves. By modifying a 5000-series aluminum alloy with minute amounts of scandium, the team was able to develop an alloy that offers optimal performance in terms of both corrosion resistance and strength; thanks to further optimized manu-facturing processes, this alloy is 70% lighter than the reference variant.

In addition to providing inights into the most relevant results oft he projects mentioned above, the presentation bridges the gap to holistic strategies for more circular design.