

Fraunhofer Institute for Casting, Composite and Processing Technology IGCV

Aluminium-Matrix-Composites - AMC

Cast processing, analysis und applications

Increasing demands on technical components result in continuous development of materials, production and processing. An approach to improve wearing properties of cast aluminium alloys is the application of metal-matrix-composites.

Particle reinforced casting alloys

Casting process of AMCs

An approach to produce AMCs is the implementation of ceramic particles (e.g. SiC) into the molten aluminium alloy. This poses some challenges in processing, especially guaranteeing a homogeneous distribution of the particles in the material and preventing clustering. The Fraunhofer IGCV is cooperating with commercial manufacturers of AMC casting alloys. Our focus is on processing the prepared alloys in the casting process. Here, similar challenges arise, as the particles have to be kept in suspension until the end of the casting process to realise a homogeneous distribution in the final cast product. Furthermore, melt treatment and machining of the cast parts also prove to be challenging. High wearing properties, as is desired for the final product, of course complicate the machining process.

Practical application of AMCs

Due to high wearing properties, AMCs are open to new areas of applications, compared to usual cast aluminium alloys. With AMCs it is possible to cast technical parts with high demands, like brake discs, with much lower weight than e.g. cast iron brake discs, but also good wearing properties and much higher thermal conductivity. Further applications may be cast parts for pump technology or other parts with high demands on wearing. Micrograph of an AMC sample containing 20% SiC ©Fraunhofer IGCV

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