

In situ compressive deformation of cellular MMC within an XCT and its impact on the phase composition

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Abstract

Cellular materials open a wide range of light weight applications. Recently a new class of MMC based on TRIP-steel and partly stabilized zirconia have been developed. These materials can be manufactured in the form of foams, honeycombs or even hollow spheres. It could be shown that the energy absorption capability is enhanced by the ceramic reinforcement. Thus, possible applications are crash absorbing systems. Stopped in situ compressive deformation experiments have been performed in a laboratory X-ray computer tomograph. In this way the deformation behavior of the different cellular materials could be described. The phase composition has been measured in dependence on the deformation by using EBSD. Thus, the interaction of local deformation and martensitic phase transformations within the steel matrix and the particle reinforcement could be analyzed. The differences between the materials under consideration are discussed.

Keywords

MMC, XCT, EBSD, in situ compressive deformation, microstructure

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