Numerical Modelling of Influence of Interface Properties on the Performance of Interpenetrated Composites

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Multiphase Ceramic Composites (CCs) are used in several modern industries like aerospace, automotive, nuclear power, or defense. They are used in the situation of expected extreme loads like variable loads or impacts.

The interpenetrating composites (IPCs) is a class of composites that are defined by the technological process. The IPCs consist of a crushable skeleton and a metallic phase introduced into the skeleton under pressure. The resulting material combines the features of the skeleton and the filling metal.

Earlier analyses of the composite systems showed the significance of the interface between the particular phases [1, 2, 3] for the overall performance of the samples and its load-carrying capacity. An attempt to include the mechanical properties based on atomistic simulations is shown.

An analysis of samples of IPC based on SiC ceramic skeleton and an aluminum alloy under impact conditions is performed. The 3D structure of the sample is obtained with CT scans. The numerical model takes into account the properties of the interfaces between the phases. It has been noted that the interface properties are a significant feature of the materials and the resulting numerical model.

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