1st International Conference on Thermo-Mechanically Graded Materials

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Preface

Graded product properties based on microstructural material properties that have been selectively influenced on a local basis constitute the scientific focus of the 1st International Conference on Thermo-Mechanically Graded Materials which is being held in Kassel on 29 and 30 October 2012.

The scientific basis for this conference is provided by Collaborative Research Centre CRC/Transregio 30 on this same subject, which is being sponsored by the German Research Foundation (DFG) and has been running at the TU Dortmund, the University of Paderborn and the University of Kassel since summer 2006. Transregio 30 took up what was a new subject area back then and, in the meantime, the scientific study of the manufacture of functionally graded products has gratifyingly become established internationally in a wide range of scientific communities. It was thus time for an internationally-oriented conference to be launched on the basis of Transregio 30.

The very broad range of lecture topics might appear somewhat unusual at first sight: different materials such as steel, plastics and aluminium are covered, as are production engineering, materials technology and numerical control questions. Upon closer inspection, however, this is seen to be only logical. If, in future, we wish to efficiently implement the complex tasks that a product is called upon to fulfil with limited resources, it is essential to push back the current limits of production engineering and materials technology. And it goes without saying that the new technical solutions that result from this must be mapped out in virtual terms too so as to achieve predictable results for the process and product properties.

The scientists working on Transregio 30 are convinced that their interdisciplinary cooperation - namely the highly effective linking of production engineering, materials technology, material modelling and numerical control, transcending the individual material boundaries – will lead to new solutions for functionally designed materials for the future.

One key aspect here is practical relevance. It is not the aim to come up with special solutions for niche applications but rather with production processes that can be employed on an industrial scale for high-quality products with complex properties. This steps up the demands on the research work and explains why a pronounced interdisciplinary approach was selected right from the start.

We trust that this view of the situation is reflected in the papers at the conference in October 2012. The conference proceedings that you have before you contain manuscripts both from scientists in Transregio 30 and from other working groups that are active on an international basis. The close links with industry also become clear when you take a look at the conference programme: the chairpersons for the conference are almost all representatives of eminent companies – namely, potential future users of the research results.

We trust that you will enjoy reading these conference proceedings and will gain new insights from them.

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