

Executive Summary Deliverable D2.2

Guidelines for conducting finite element simulation of graded/non-graded multi-materials

This deliverable is a guideline for conducting finite element simulations of graded and non-graded multi-materials. The guideline first describes the process, then describes a possible way to transform the process into simulation environments where a method is proposed to model mixtures of multiple materials that are used in the graded structures. In this method, material properties are combined according to the volume fractions of the constituents. After the modelling is covered, a method to calibrate and verify the simulations is presented. The simulations can be calibrated first by making an experiment where temperature is recorded. Then, the verification is done by simulating a different process setup with the model parameters defined in the calibration. The challenges involving the simulation of multi-material structures are discussed. To model the chemical interactions between different materials, it is proposed to use a mixing model where material properties are obtained by combining the properties based on volume fractions of the constituents. For the physical interactions between different materials, sources of errors are identified.