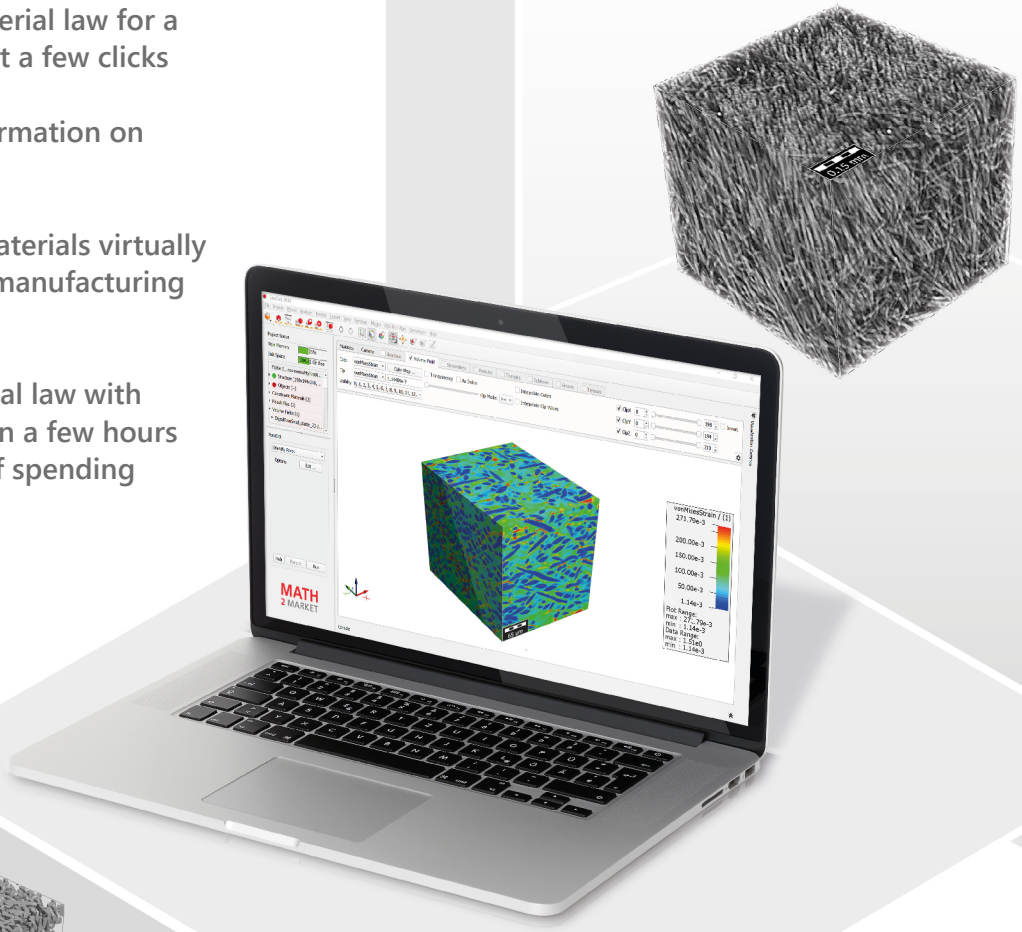
GeoDict

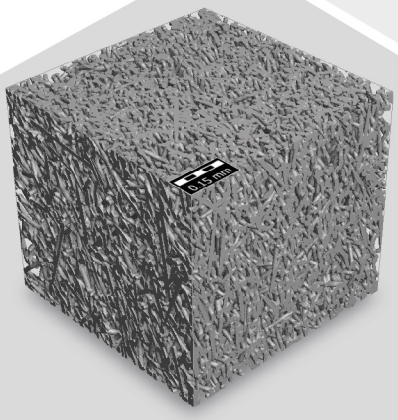
The Digital Material Laboratory

GeoDict® Workflow for Composites

Define Your Own Material Law Based on Experiments

- Define your own material law for a polymer matrix in just a few clicks
- Simulate plastic deformation on microscale
- Compare different materials virtually without the need of manufacturing prototypes
- Combine your material law with different fiber types in a few hours on your PC instead of spending days in the lab





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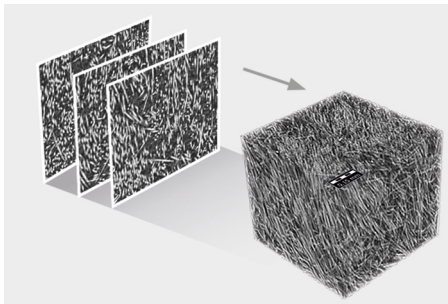
GeoDict® Workflow for Composites

1A Data Acquisition

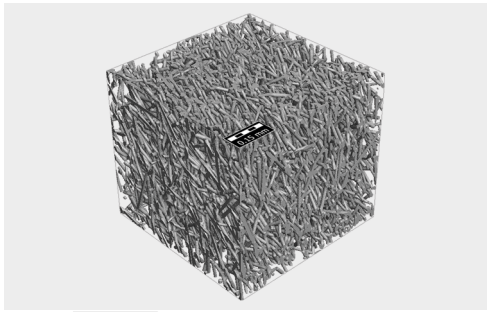
OR

1B Structure Generation



- Import 3D image data, e. g. µCT scans to obtain material model
- Analyze material model with FiberFind to get statistical information, such as:
  - Fiber orientation
  - Fiber diameter distribution
  - Fiber length distribution

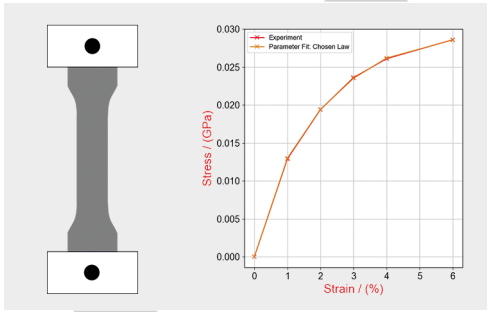
Result: Material model and statistical information



- Generate your own material model with FiberGeo or WeaveGeo – our generators for fiber structures and weaves
- Design your material model from scratch or use statistical data from previous analysis
- Vary your material model to do parameter studies

Result: Material model

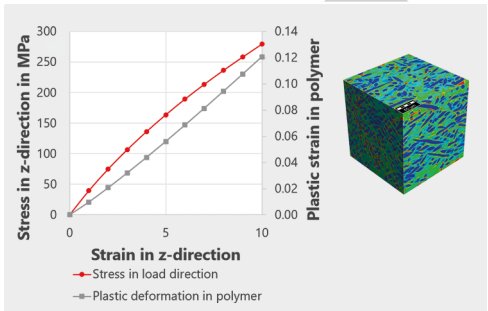
2 Fit Material Law



- Import stress-strain-curves of matrix polymer from experiment
- Use GeoDict's reverse engineering function to find plastic material law of experimental data

Result: Customized material law

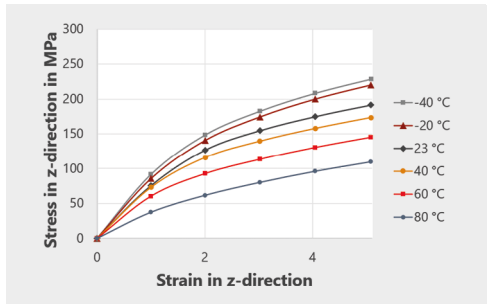
3 Simulation



- Predict stiffness tensor of your composite and simulate deformation of your composite
- Investigate local strains and stresses
- Investigate either elastic strain, plastic strain or both
- Plot stress-strain curves

Result: Mechanical behavior of your composite

4 Parameter Studies



- Modify fiber structure, e. g. change fiber volume fraction
- **Vary material laws**, such as:
  - Define material laws for different conditions (moisture uptake, crystallization)
  - Define material laws for different operating temperatures
- Replace materials, e. g. switch from glass to carbon fibers

Result: Most promising designs of your composite

SN-191101

Math2Market GmbH | Richard-Wagner-Str. 1 | 67655 Kaiserslautern, Germany
☎ +49 631 205 605 0 +49 631 205 605 99 support@math2market.de
www.GeoDict.com

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