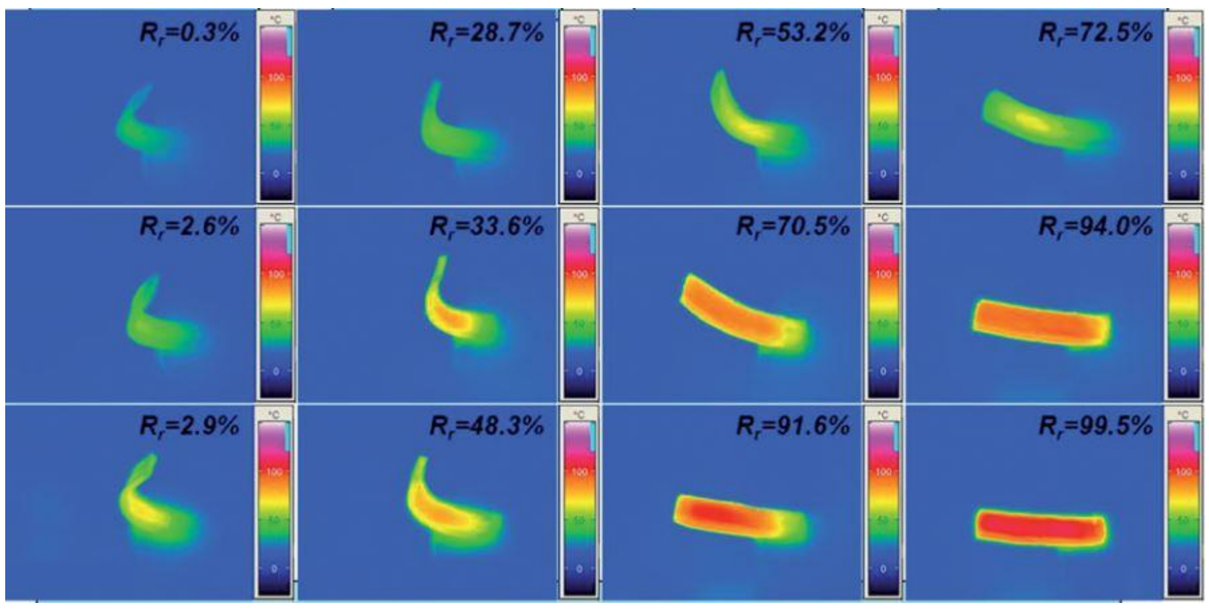
Karlsruhe Institute of Technology

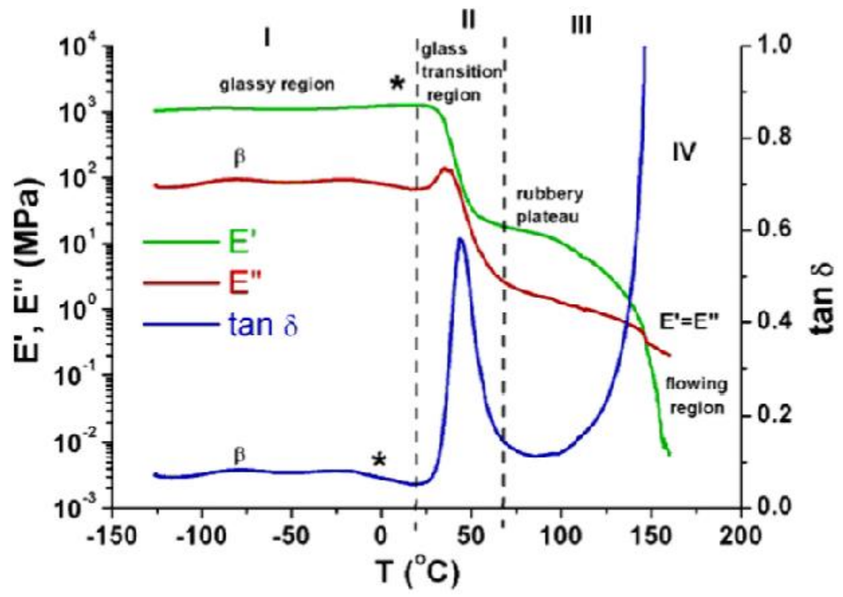
INSTITUTE FOR PULSED POWER AND MICROWAVE TECHNOLOGY

Masterarbeit

Characterization of the Shape-memory Properties of Carbon Fiber Reinforced PLA Components



Shape transition of PLA plate



Dynamic Mechanical Analyzing (DMA)

Motivation:
Morphing structures have been investigated for a wide range of applications from deployable spacecraft solar panels, aircraft morphing wings and morphing bodies of automobiles, to architectures that respond to the environment. By replacing current heavy and joint-based mechanical actuators with next-generation morphing constructions based on shape-memory polymers (SMP), a lightweight, continuous, and smooth shape transformation can be achieved. Thus, the shape-memory properties of carbon fiber reinforced polylactic acid (PLA) components should be studied.

Contents:
- Research the state-of-the-art method of producing and characterization the PLA based SMPs
- Use infrared camera to measure the temperature variation induced shape morphing of PLA samples
- Use NETZSCH DMA to test the recovery and fixity rate of carbon fiber reinforced PLA samples
- Understand the correlation of temperature-strain-fiber volume fraction

Requirements: Material science and engineering, mechanical engineering or comparable

Type of work: Analytics, Experiments

Prerequisites:
- Motivation and interest in the area of material characterization
- Independent and structured way of working
- Previous knowledge and experience on DMA is an advantage

Start time: now

Contact: Dr. Nanya Li
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Location: Campus North/Campus East

GEFÖRDERT VOM Bundesministerium für Bildung und Forschung
BETREUT VOM PTKA Projektträger Karlsruhe Karlsruher Institut für Technologie