

## Bachelor-/Masterarbeit



TECHNISCHE  
UNIVERSITÄT  
DARMSTADT

INSTITUT FÜR  
WERKSTOFFE  
IM BAUWESEN

# Influence of carbon nanotubes on the microstructure and mechanical properties of geopolymers

Geopolymers (GP) have become popular in recent years as an advanced ecofriendly alternative to cement. Not only can geopolymers reduce CO<sub>2</sub> emissions by more than 40%; compared to traditional cement, but also present excellent chemical and fire resistance. To enhance its mechanical properties, there is an increased focus on the use of nanomaterials as reinforcing additives. The use of carbon-based nanomaterials like multi-walled carbon nanotubes (MWCNTs), can significantly strengthen the microstructure of these composites in the nanoscale producing stronger “greener” construction materials.

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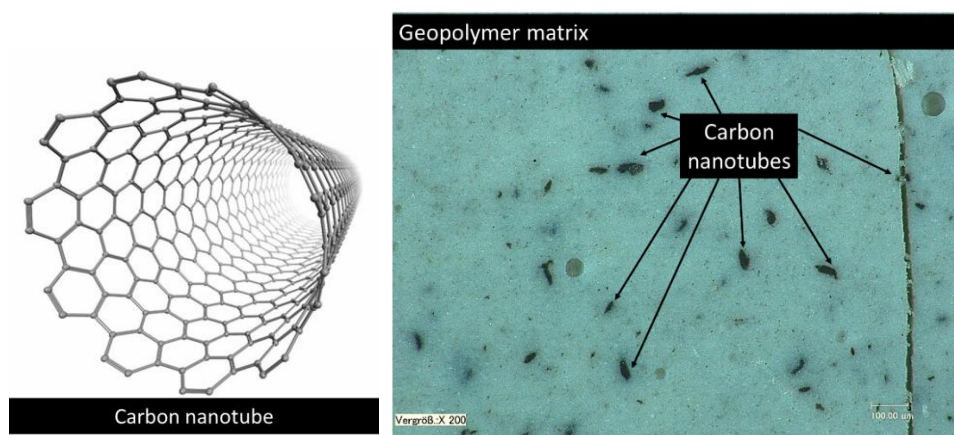
Darmstadt, 08.03.22

**Goal:** To investigate the effects of different parameters on the microstructural and mechanical properties of metakaolin based geopolymers reinforced with carbon nanomaterials.

For this, following tasks and methodology are envisioned:

- Literature review on CNTs-GP composite materials
- Experimental study of microstructural and mechanical properties of CN-GP pastes
- Analysis and discussion of results.

**Methodology:** Compressive and Flexural strength, Mercury Intrusion Porosimetry (MIP), TGA, FTIR, SEM, optical microscopy, RAMAN, XRD, rheology



Der **Umfang der Ausarbeitung** kann der Abschlussarbeit entsprechend angepasst werden. Die exakte Aufgabenstellung kann je nach Wunsch der Studentin/des Studenten flexibel angepasst werden.