

Seminar paper / Master thesis

## Effects of agglomeration on elastic properties of nanoparticle/epoxy nanocomposite

### Motivation:

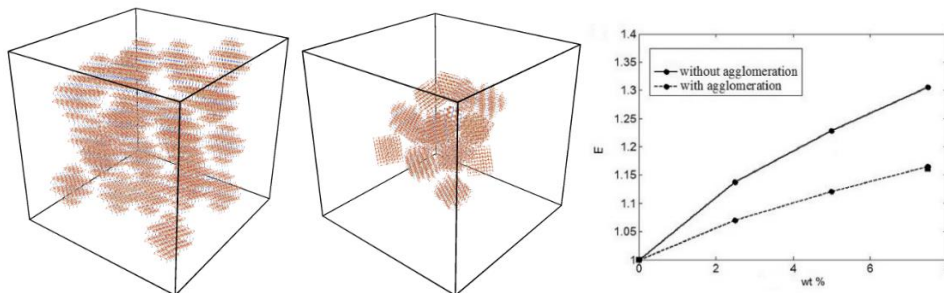
Polymer nanocomposites have found many industrial and engineering applications due to their unique combination of low cost, relatively easy processing and superior mechanical properties. The polymer nanocomposites have shown enhanced elastic properties compared to the neat polymers. Depending on the chemical composition, nanoparticles typically show a tendency to form agglomerates. Agglomerates mean when nanoparticles form into group instead of being randomly distributed. Nanoparticle agglomeration is usually reduced and controlled during manufacturing, but is not completely avoidable. That is why the effects of agglomeration on elastic properties is important to take in to account in simulations.

### Aim:

The student in this project is to compare two cases: one is the polymer nanocomposite with randomly distributed particles and the second case is the polymer nanocomposite with agglomerated particles. The aim is to show the differences of elastic properties between nanocomposite with and without agglomeration.

### Structure:

- The literature review on polymer and polymer nanocomposite materials.
- The literature review and getting familiar with Molecular dynamic and Coarse grained simulations.
- Start programming (in MatLab) and create nanoparticle/epoxy nanocomposites models.
- The end face of project is post processing of the results.



### Objectives:

Interested in Molecular dynamic (MD) and fundamental understanding in Finite Element (FE) and programming.

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