Bachelor thesis

A study on environmental stress cracking in polymer nanocomposites

Background:
Environmental stress cracking is one of the most common causes for unexpected failure of polymer-based components. Almost 90% of these failures occur in glassy polymers. In order to increase the service lifetime of these polymer based components and ultimately contribute to an improvement of the user safety, the incorporation of nanoparticles into the polymer matrix has proven to enhance the resistance against ESC.

The objective of the thesis is to investigate the effect of nanofillers on the ESC properties of nanocomposites. The tests should be carried out at a constant load and different temperatures. Moreover, the mechanical properties of the nanocomposites are to be examined.

This work should contain following parts:
- A state of the art regarding the influence of nanofillers on the ESC resistance and mechanical properties of the nanocomposites.
- Tensile testing and impact testing of the nanocomposites
- Load optimization for the PMMA nanocomposites
- Examination of the ESC resistance of the nanocomposites against ESC agents at different temperatures between 23°C and 50°C.

The thesis has to be worked on and documented following the guideline for “Good Science Practice” of the “German Research Foundation”

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