

## Supervisor's Survey of PhD student Hamza Mahmoud Ahmed Aboelanin

The topic of the PhD work *Synthesis and characterization of molecular structure and dilute solution properties of methacrylate polymers* was given by significance of branched polymers from both theoretical and practical aspects. The topic also agreed with some of the projects of company SYNPO Pardubice, in the laboratories of which the PhD student carried out most of the experimental work. The student prepared over 25 star-like polymers by group transfer polymerization and roughly 20 of various linear and short-chain branched polymethacrylates by free radical polymerization. All prepared polymers were carefully characterized from the view point of their dilute solution properties and molecular structure. When evaluating the student's contribution to the polymer science, one has to emphasize that some findings; namely (i) the effect of the number of arms on the specific refractive index increment, (ii) the methodology of the determination of the cumulative distribution of arms per molecule, and (iii) evaluation of the validity of various theoretical equations between the number of arms and branching ratio; have not been reported previously.

As a part of his study, Mr. Hamza Aboelanin got on an ERASMUS+ program for six months at the Fraunhofer Institute for Structural Durability and System Reliability in Darmstadt where he had a possibility to get familiar with different type of polymers and instrumentation. In accordance with the topic of his thesis, he focused on the characterization of short-chain branching. His direct supervisor Dr. Robert Brüll, and Dr. Tibor Macko, as a mentor, evaluated his work very positively and the results acquired in the Institute resulted in two peer-review papers.

Besides the main topic of the study, Mr. Hamza managed to perform series of experiments that were not directly related to the characterization of branching, namely sulfonation of PEEK and determination of molar mass distribution of sulfonated PEEK and investigation of the molar mass distribution in the course of emulsion polymerization.

During the entire study Mr. Hamza appeared as a hardworking, self-sufficient, skillful, and active experimenter; and an easy-going and friendly person. He has already published the results of his work in four papers in peer-review journals with impact factor and one poster, and He has also presented two oral presentations and two posters at four different international scientific conferences.

I recommend his PhD work for defense.

In Pardubice; September 12, 2023

  
Prof. Stepan Podzimek, PhD  
Supervisor