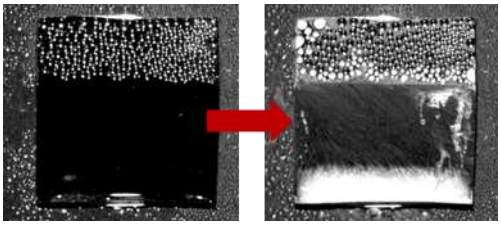
Title: Synthesis of new polyzwitterions with bioinspired anchoring groups for the preparation of functional nanofilms

Abstract:
Zwitterionic polymers, particularly polyphosphorylcholines, have been the subject of intensive research for about two decades. This is primarily due to their exceptional physicochemical properties, particularly their interaction with water molecules. These properties give rise to numerous potential applications in anti-fouling, easy-to-clean, anti-fog, anti-ice, and selective particle disassembly technologies.

Often, these applications require coatings of these polymers. In addition to questions regarding coating formation, it is crucial to covalently anchor these polymers to various substrates. Various anchoring strategies are being discussed for this purpose, including incorporating dopamine groups into the polymer.

This research topic focuses on synthesizing novel polyphosphorylcholines containing dopamine units and preparing films. First, the student will develop synthesis strategies, which will then be implemented in the laboratory. Through this process, the student will become familiar with modern controlled-radical polymerization techniques, such as ATRP and RAFT, and learn to apply them in combination with appropriate protecting group chemistry.

The aim of this research project is to convert the synthesized polymers into thin films. This includes the use of appropriate characterization techniques (AFM, ellipsometry, contact angle measurement, FTIR).



Skills that you should already have:

- Advanced knowledge in polymer synthesis and syntheses under inert conditions
- Knowledge of basic lab equipment
- Independent und safe work in chemical lab
- Excellent communication skills

Skills that you will acquire during the internship:

- Application of modern synthetic techniques for the preparing of polymers with a narrow molecular weight distribution
- Preparation techniques for generating of nanoscale films
- Usage of appropriate characterization techniques (NMR, FTIR, ellipsometry, contact angle)