Synthesis and Characterization of Novel Antibacterial Polysulfone (PSU) for Biomedical Applications

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Biomedical devices, such as implants, stents, and heart valves, have become an important part of human healthcare. However, bacteria attachment and proliferation on surfaces of biomedical devices may lead to infections that pose a substantial health risk. The creation of novel antibacterial surfaces for biomedical devices may help mitigate this issue. For this reason, we plan on synthetizing novel antibacterial polysulfones (PSU) by introducing antibacterial pendants through the copper catalyzed azide-cycloaddition (CuAAC) click reaction. The first step of this reaction is the chloromethylation of PSU, followed by the azidation of the chloromethylated PSU and finally the copper catalyzed azide-alkyne cycloaddition of antibacterial pendants. The structure of the modified PSU will be analyzed by proton nuclear magnetic resonance (^{1}H-NMR) and Fourier-transform infrared spectroscopy (FT-IR). Modified PSU membranes will be prepared by a phase inversion method and will be characterized by morphological analysis using scanning electron microscope (SEM). In order to study the antibacterial properties, halo zone tests and bacterial optical density (OD) measurements will be performed on the modified PSU membranes.