



INNOVATIVE TECHNOLOGIES IN HEALTHCARE: PHOTOCHEMICAL SURFACE FUNCTIONALIZATION OF MEDICAL DEVICES

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Background

The ability to tailor polymer surface properties has become a very important and challenging area of science. Most medical devices are constituted of polymeric materials, since they offer a great choice in terms of compromise between processability, properties, and cost. The behavior of these polymers with respect to blood or the human body depends on the chemical structure. Surface modification of medical device components is a powerful method to adapt the interface properties.

Objectives

The purpose of the project is to develop a new coating technology to increase angioplasty balloon catheter performances. Such performance improvement will be achieved by means of innovative technologies for polymer surface functionalization. The coating technology will be used to decrease the coefficient of friction of polymers constituting medical devices, to increase their compatibility with human body and to create functional groups for the delivery of drugs.

Methodologies

Several surface modification processes will be achieved. Optimum conditions for photochemical and physical processes will be identified. Key parameters will be optimized to control the process setups. Medical device components will be tested in order to evaluate mechanical, physical and chemical properties.

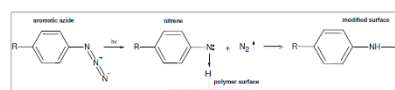


Fig. 1 Photochemical surface modification using aromatic azide

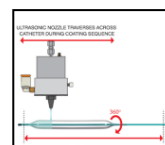


Fig. 2 Spray coating process

Expected Results and Impact

This research project expects to have the following outcomes by the end of the project: successful development of lubricious coatings for medical devices (decrease of the coefficient of friction in aqueous environments); successful development of controlled-drug release coating. The results will be evaluated by means of a comparative assessment with commercial products. This development process will include testing towards a practical solution for medical device application.