

Hydrophylic Coatings for Biomedical Applications - Hydrophilic Gradient Gels

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Medical devices such as catheters and tubing are required to deliver increased functionality, lower profiles, and smaller size. Next-generation tubes and catheters are also being designed to transport target-specific drug-polymer payloads or flexible microelectronic packages to various parts of the human body. These enhanced miniaturization and functionality requirements of medical devices are also creating substantial design and manufacturability challenges. One of these challenges is to provide proper coating that vary in lubricity and texture to meet the requirements of the specific medical device tubing or catheter. On one hand the coating should strongly adhere to the hydrophobic substrate and on the other hand provide proper lubricity in the hydrophilic environment in human cavities. Common requirements from the coating are low friction, high lubricity, shear resistance, non-degradability, biocompatibility, low cytotoxicity and little change in properties over time. In addition coating thickness should be as small as possible (in the micron range) and uniform over the entire device. Here we describe the coating process of a crosslinked-polymer based coating showing a gradient of hydrophilicity from hydrophobic near the device surface to provide proper adhesion, to highly hydrophilic at the opposing surface in contact with the tissue, to provide the necessary lubricity.