

Plasma modification of polymer surfaces and their utility in building Biomedical Microdevices.

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Abstract:

Polymers are largely used in micro-systems where there may be biological detection and sensing and provide easier alternatives of fabrication for Biomedical Micro-devices. The most widely used polymeric system amenable to micro-fabrication is that of silicone rubber particularly poly dimethyl siloxane (PDMS). The principle advantage that silicone rubber offers is in terms of its ability to get replicated with high aspect ratios by micro-molding. Apart from this other polymer systems like resists or epoxies find extensive use in micro-fabrication providing many aspects like interlayer bonding, selective patterning, modified physical properties like variable electrical or optical properties etc. Most polymer systems are amenable to rapid change in their surface energies as they are exposed to gas plasmas or UV radiation. Such changes can sometimes be reversible and the exposed surfaces can regain their original configuration with time. In general the polymer surface after such external stimuli become highly dynamic in constitution and this makes them well suited to some prominent applications in realizing Biomedical micro-devices (BMMD). Our groups have extensively worked in the area of polymer surface modification by external stimuli and its characterization and through this paper we have attempted to review some of the groups work.