Supporting Information

Details of the functionalization process of the silicone sheets by plasma polymerization

Plasma polymerization experiments were carried out in an electrodeless cylindrical glass reactor (6 cm diameter, 680 cm³ volume, base pressure of 5×10^{-4} mbar, and with a leak rate better than 1.0×10^{-10} kg s⁻¹) enclosed in a Faraday cage. The chamber was fitted with a gas inlet, a Pirani pressure gauge, a two-stage rotary pump (Edwards) connected to a liquid nitrogen cold trap, and an externally wound copper coil (4 mm diameter, 5 turns). An L-C matching network (Dressler, VM 1500 W-ICP) was used to match the output impedance of a 13.56 MHz R.F. power supply (Dressler, Cesar 133) to the partially ionized gas load by minimizing the standing wave ratio of the transmitted power. Prior to each experiment, the reactor was cleaned by scrubbing with detergent, rinsing in propan-2-ol, oven drying, followed by a 30 min high-power (60 W) air plasma treatment. The system was then vented to air and a silicon sheet was placed into the centre of the chamber followed by evacuation back down to base pressure. Subsequently, maleic anhydride vapour was introduced into the reaction chamber at a constant pressure of 0.2 mbar and with a flow rate of approximately 1.6×10^{-9} kg s⁻¹. At this stage, the plasma was ignited and run for 30 min. The optimum deposition conditions correspond to: power output = 5 W, pulse on-time = 25μ s, off-time = 1200 µs.¹ Upon completion of deposition, the R.F. generator was switched off, and the monomer feed allowed to continue to flow through the system for a further 2 min prior to venting up to atmospheric pressure. A more detailed description of the technique is given in reference¹. Next the plasma polymer functionalized silicone sheets were stored under ambient conditions during one week. The storage leads to the hydrolysis of the maleic anhydride groups that are converted quantitatively into carboxylic groups. These charged groups allow to deposit subsequently the polyelectrolyte multilayer uniquely by electrostatic interactions.

Reference

(1)

Siffer, F.; Ponche, A.; Fioux, P.; Schultz, J.; Roucoules, V. Anal. Chim. Acta 2005, 539, 289-299.