

**Supporting Information.**

**Determination of refractive index and thickness of p(DDA/tBVPC53) Lb films by SPR**

A silver layer (ca. 52 nm) was vacuum-evaporated on glass substrates. The p(DDA/tBVPC53) LB films were deposited onto the substrate. Surface plasmon curves were measured as a function of the number of deposited layers (Figure s1). Initially the dielectric permittivity and the thickness for silver layer were determined;  $-16.9 + 0.65 i$ , and 52.0 nm, respectively. Surface plasmon curves were fitted using Fresnel's equation. Optical parameters for p(DDA/tBVPC53) LB films are listed in Table s1.

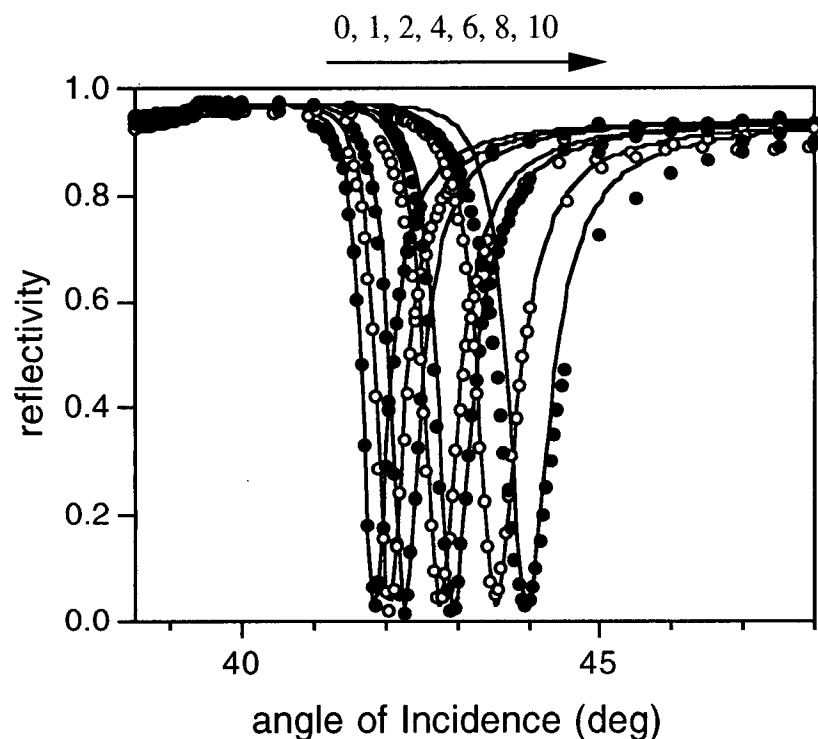


Figure s1. Surface plasmon curves for p(DDA/tBVPC53) LB films as a function of the number of deposited layers: (from left) 0, 1, 2, 4, 6, 8, and 10 layers.

Table s1. Optical parameters for p(DDA/tBVPC53) LB films.

layer No.	n	d (nm)
1	1.508	1.55
2	1.508	1.53
4	1.514	1.56
6	1.508	1.24
8	1.508	1.34
10	1.508	1.31

n: refractice index at 632.8 nm; d: thickness per monolayer

### Monitoring of Etching Resistance Properties.

A schematic of a Teflon cell is shown in Figure s2. A Teflon cuvette (volume 3.5 ml) was placed on the p(DDA/*t*BVPC53) LB films and sealed with a O-ring. A high refractive index prism was coupled to the other side with matching oil and mounted to the rotating sample stage. 10wt% HNO<sub>3</sub> aqueous solution was introduced and withdrawn by means of a peripheral pump.

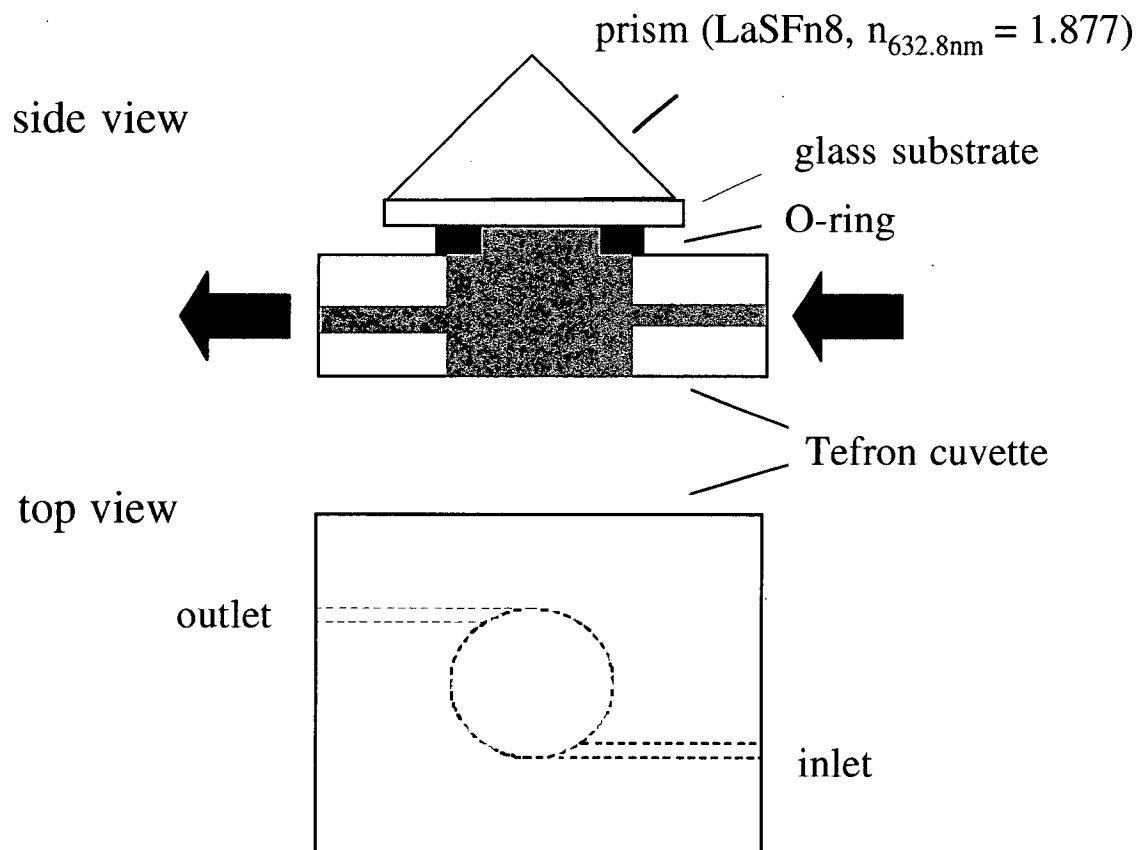


Figure s2. A schematic of in-house Tefron cell.