

## Appendix A/Supplementary Material

### Differential Refractometric Biosensor for Reliable Human IgG detection: Proof of Concept

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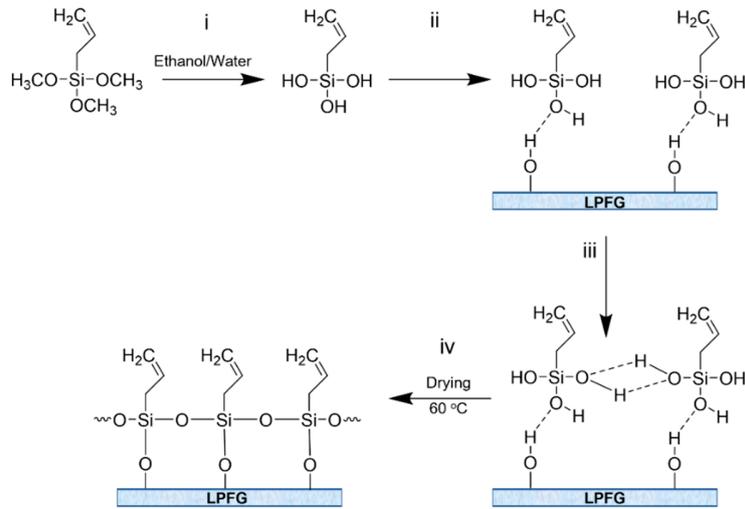
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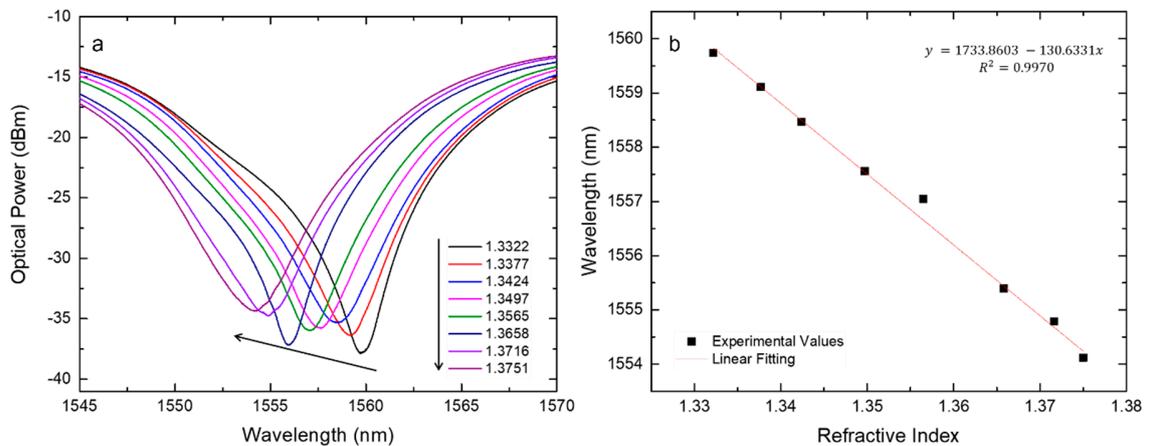
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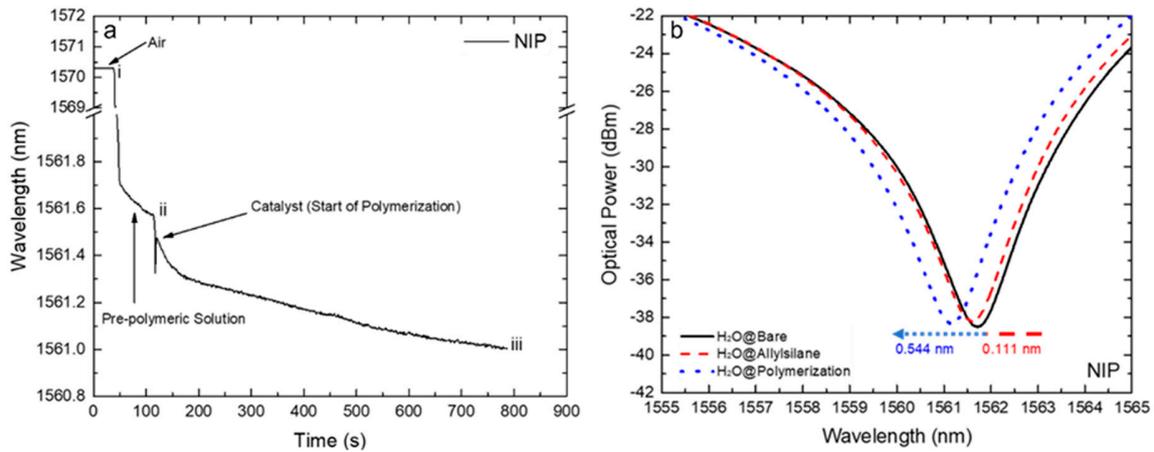
**Supplementary figure S1** – Schematic figure of the fiber surface allylation process: i. hydrolysis (formation of -OH groups); ii. chemisorption (reaction of the allylsilane with the LPFG surface); iii. cross-polymerization (reaction between different allylsilane molecules at the LPFG surface); iv. covalent bond formation (monolayer formation).



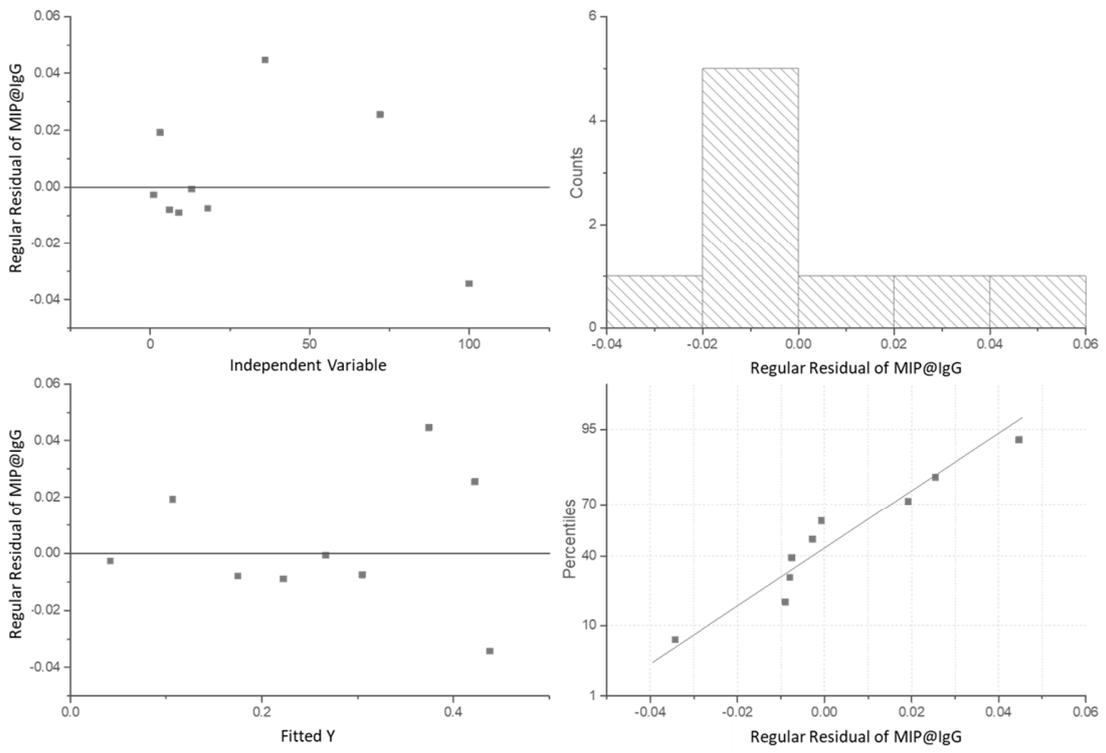
**Supplementary figure S2** – (a) Attenuation band spectra for different ethylene glycol refractive index solutions; and (b) respective calibration curve plotting the wavelength position of each attenuation band ( $n = 10$ ) as a function of the refractive index.

**Supplementary equation S1**, where **FOM** is the Figure of Merit, **S** is the sensitivity of the sensor, and **FWHM** is Full Width at Half Maximum of the resonance wavelength band.

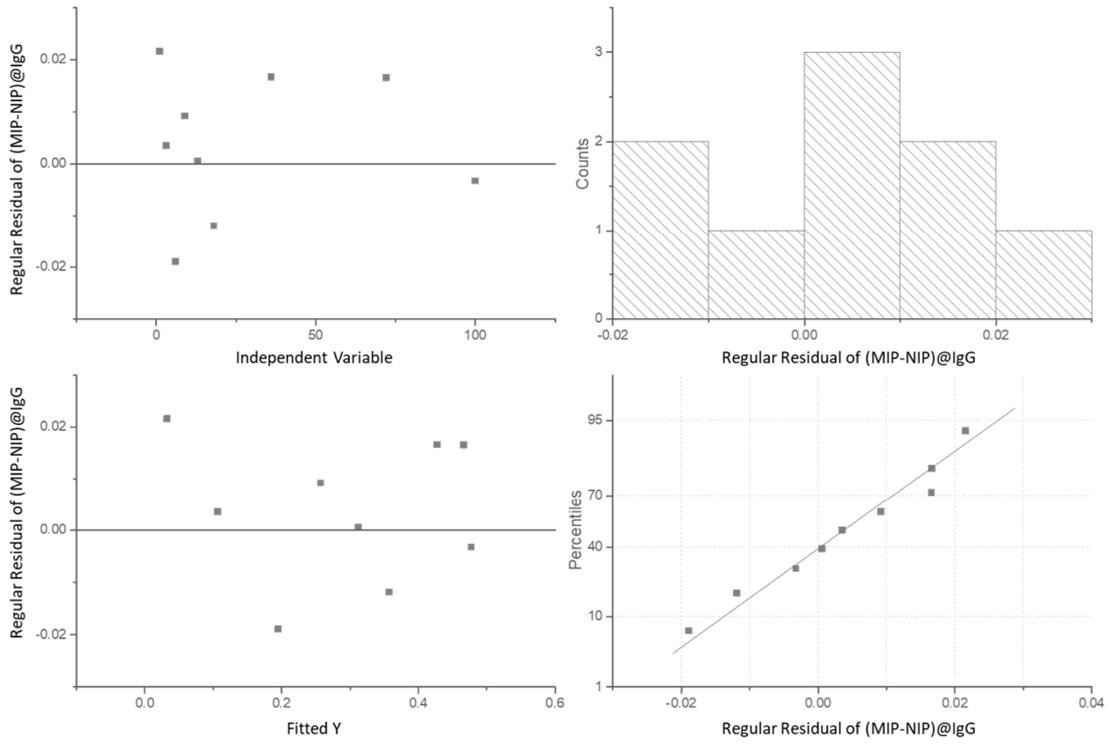
$$FOM = \frac{S}{FWHM} \quad (\text{Equation S1})$$



**Supplementary figure S3** - (a) Real timeline of the resonance wavelength position of the NIP polymerization process: i. the pre-polymeric solution was placed; ii. the catalyst was placed; iii. the polymerization process was stopped. (b) Acquired spectra showing the wavelength resonance shift after allyl-silanization process (dashed line) and MIP layer formation (dotted line). Solid line is the bare fiber spectrum in water.



**Supplementary figure S4** – Residual Plots resulted from the Hill fitting of the MIP@IgG curve.



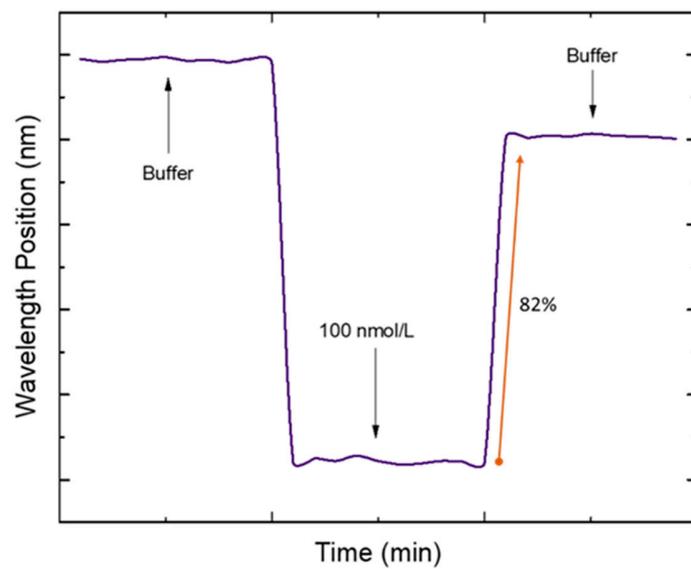
**Supplementary figure S5** – Residual Plots resulted from the Hill fitting of the (MIP-NIP)@IgG curve.

**Supplementary equation S2**, Hill model equation where  $\Delta\lambda_c$  is the wavelength variation at the concentration  $C$ ;  $\Delta\lambda_{max}$  is the wavelength variation at the saturation point (or response to the infinite);  $K$  is the ligand concentration at the  $1/2 \Delta\lambda_{max}$ ; and  $n$  is the Hill coefficient.

$$\Delta\lambda_c = \frac{\Delta\lambda_{max} \times C^n}{(K^n + C^n)} \quad (\text{Equation S2})$$

**Supplementary equation S3**, where  $\beta_2$  relates with the selectivity and activity of the ions,  $\beta_1$  is the slope parameter, and  $\sigma$  is the standard deviation of the blank.

$$LOD_{S/N} = \beta_2 \left( 10^{\frac{3\sigma}{\beta_1}} - 1 \right) \quad (\text{Equation S3})$$



**Supplementary figure S6** – Wavelength peak position of the differential (MIP-NIP) shifting over time throughout reversibility trials.