

Label-Free Anti-human IgG Biosensor based on Chemical Modification of a Long Period Fiber Grating Surface

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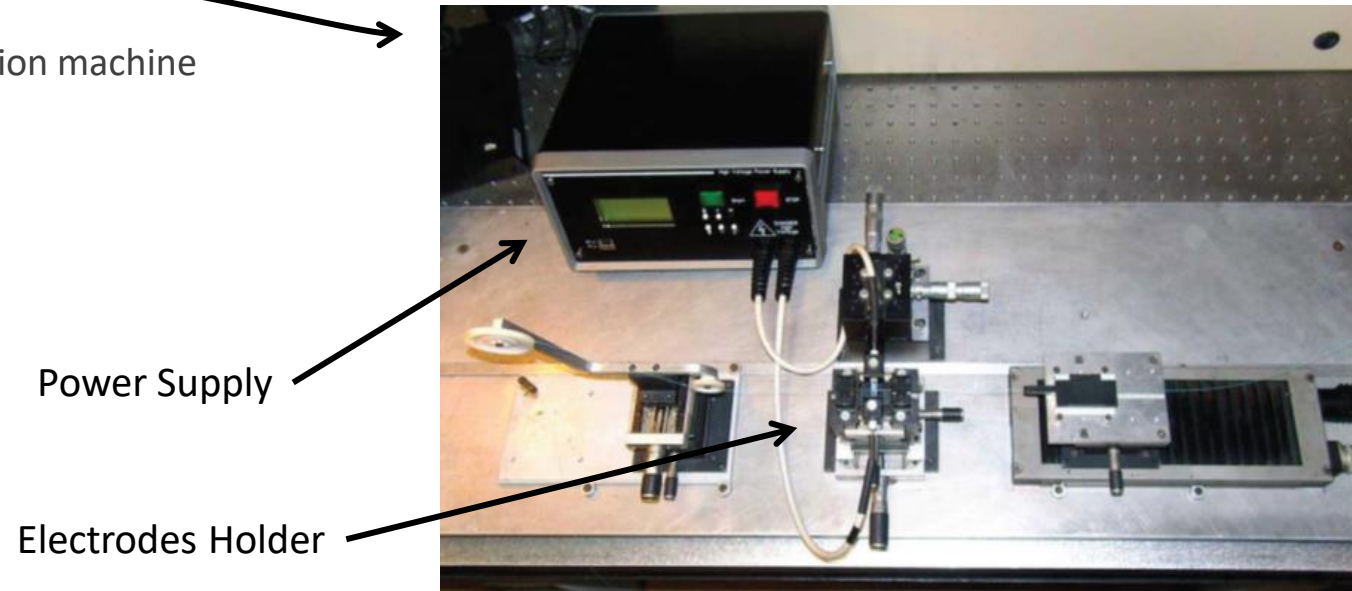
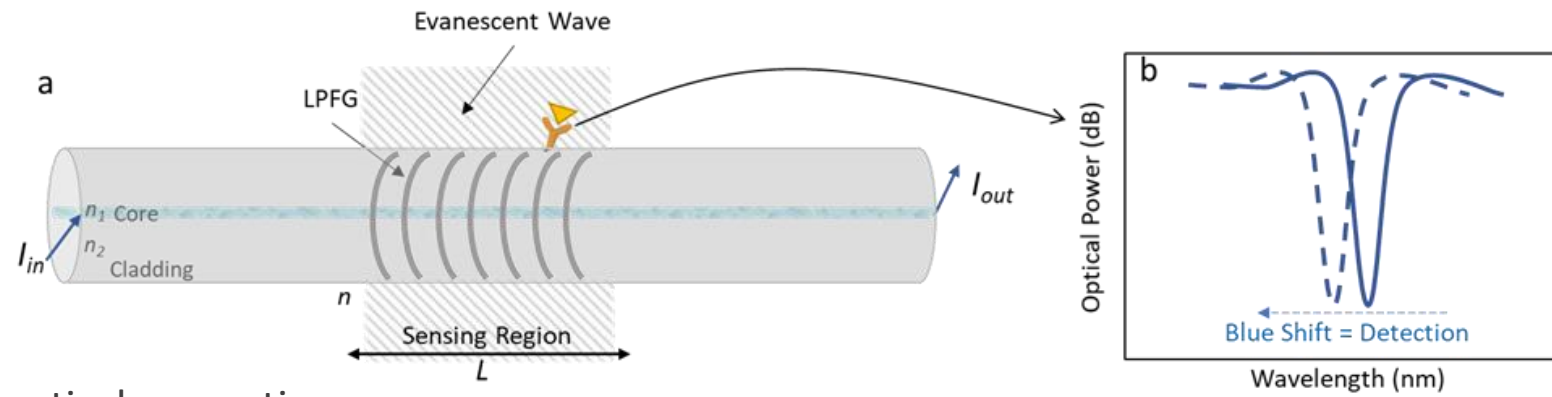
Outline

- ✓ Sensing Methodology
- ✓ Biorecognition Molecule Synthesis
- ✓ LPFG Surface Modification
- ✓ Results
- ✓ Conclusions

Sensing Methodology

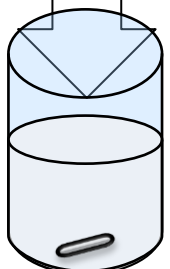
Long Period Fiber Gratings (LPFGs)

- Selective wavelength filter
 - Introduction of periodic modulation in the fiber optical properties
 - Evanescent wave interactions
- Produced by:
 - UV, IV (femtosecond pulses), CO₂ lasers...
 - ✓ **Induced electric-arc technique**
 - ✓ Under tension and placed between two electrodes in a fiber fusion machine
- Highly Sensitive
 - Temperature
 - Strain
 - Torsion
 - Pressure
 - ✓ **Refractive Index**



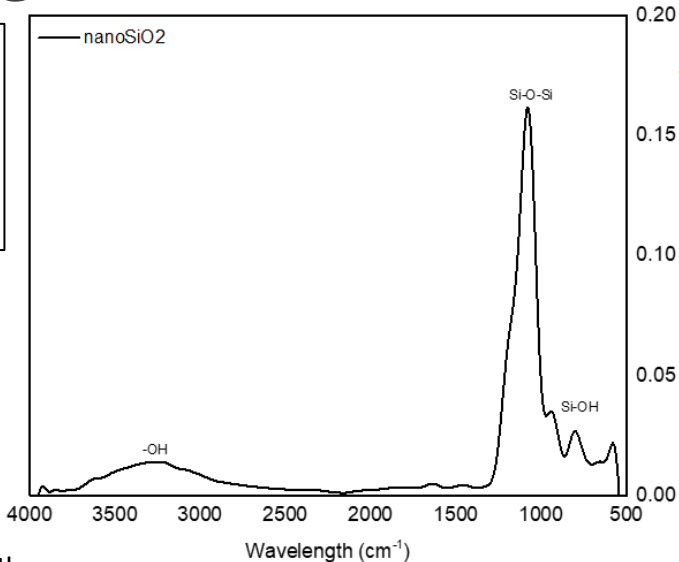
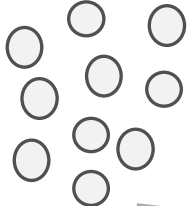
Biorecognition Molecule

Ethanol
Ultra-pure water
TEOS
Ammonia Solution
(after sonication)

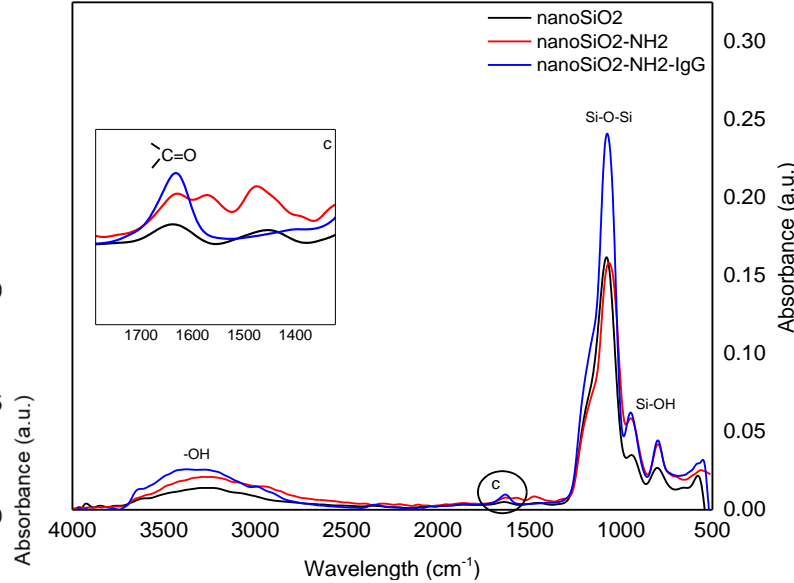
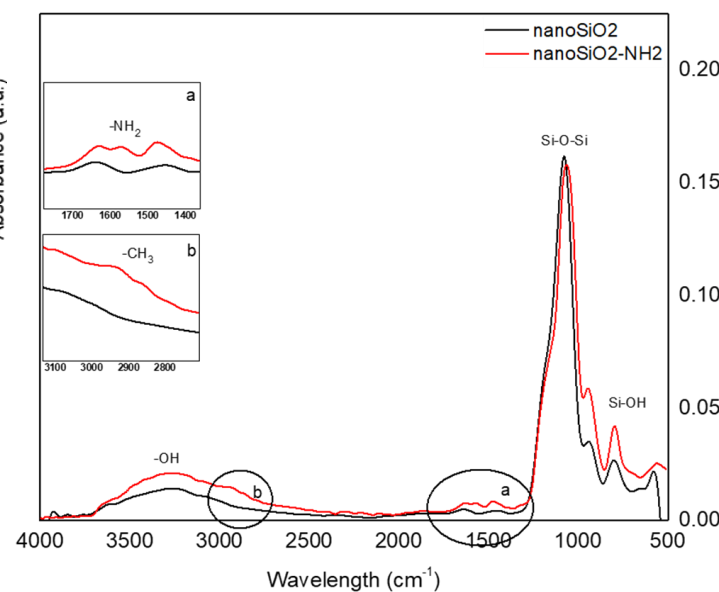
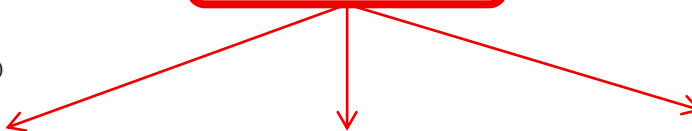


Continuous Stirring, 24h

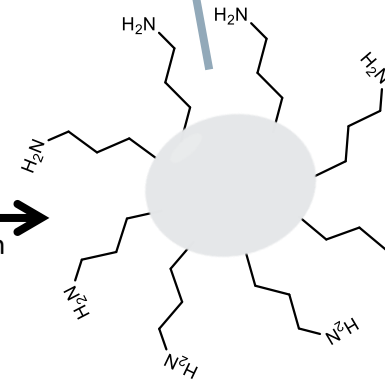
Centrifugation
&
Washing



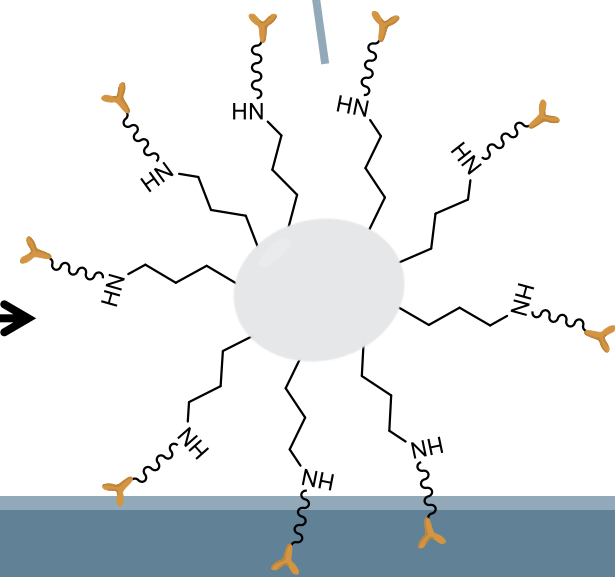
FTIR-ATR



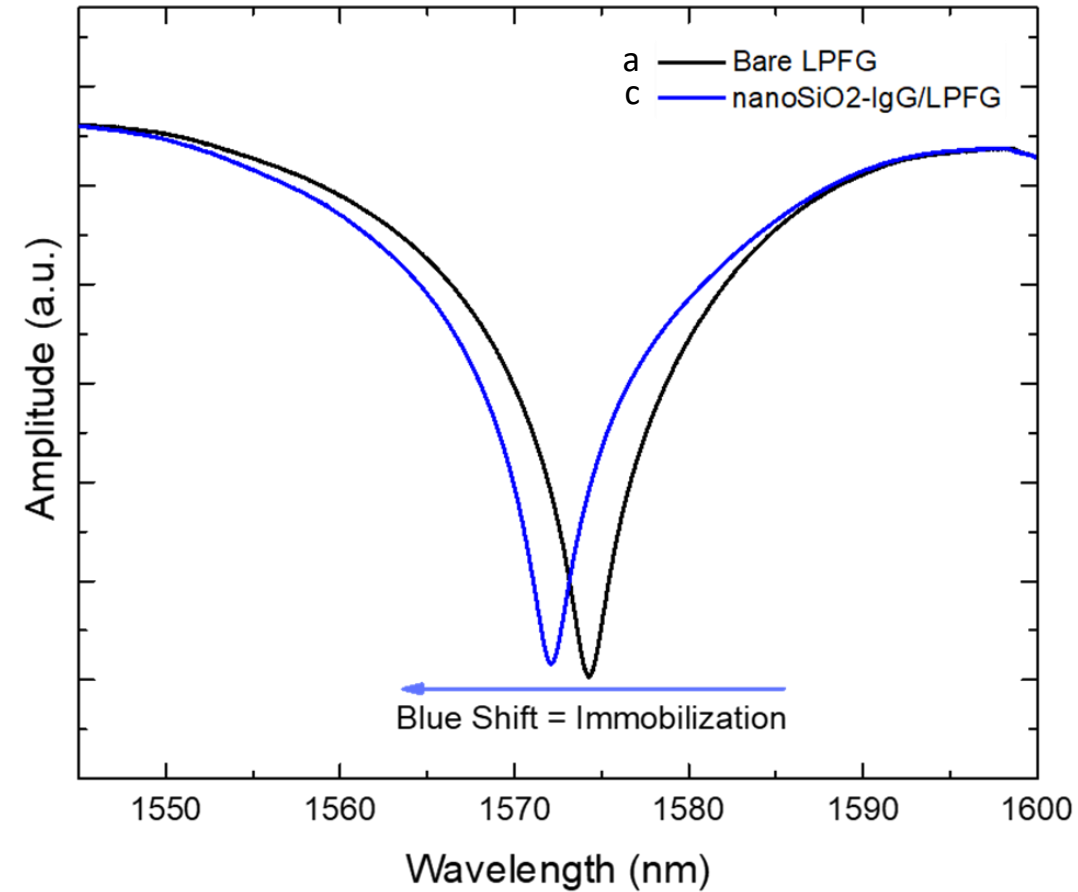
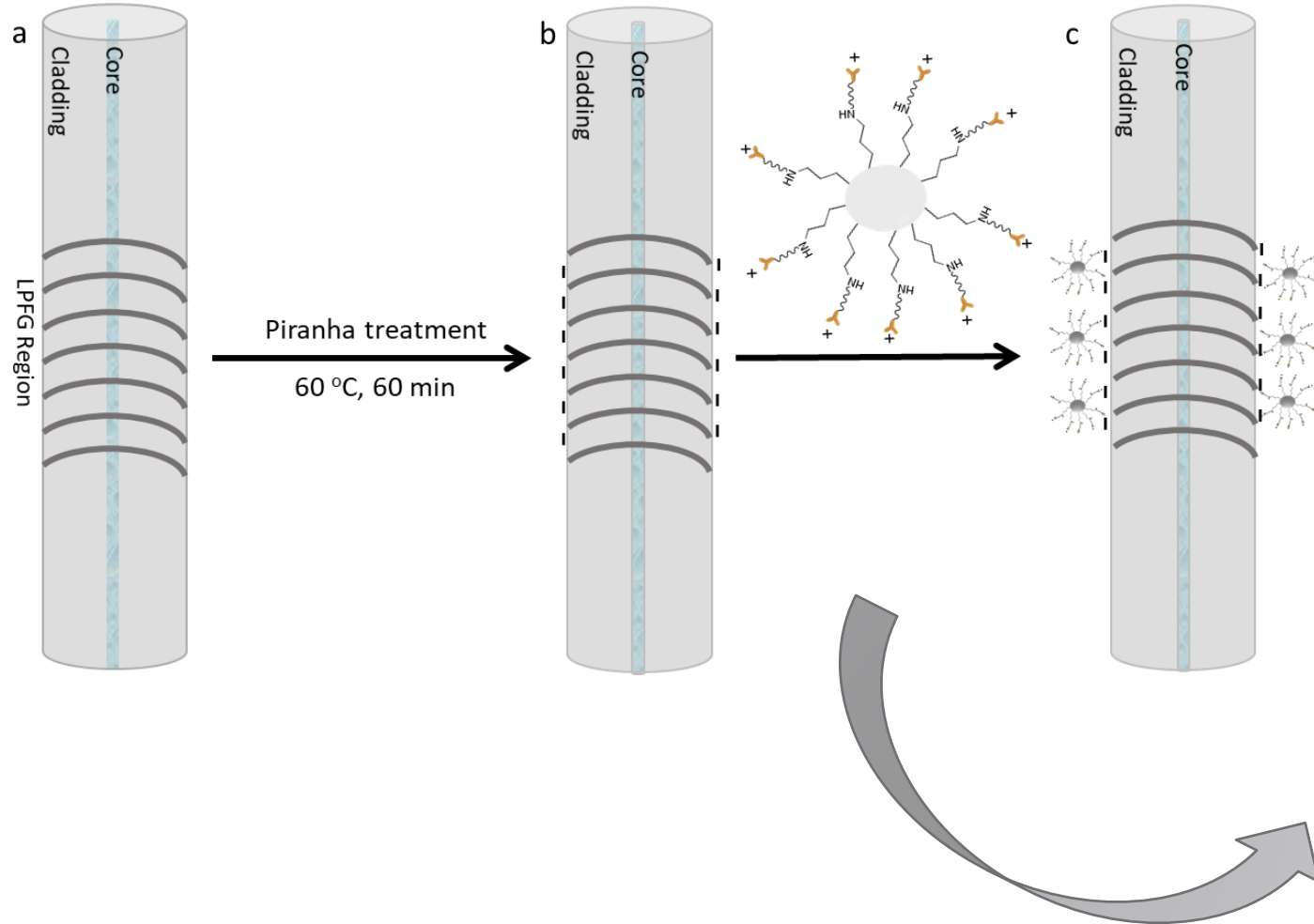
APTMS
Toluene, 24h
Centrifugation
&
Washing



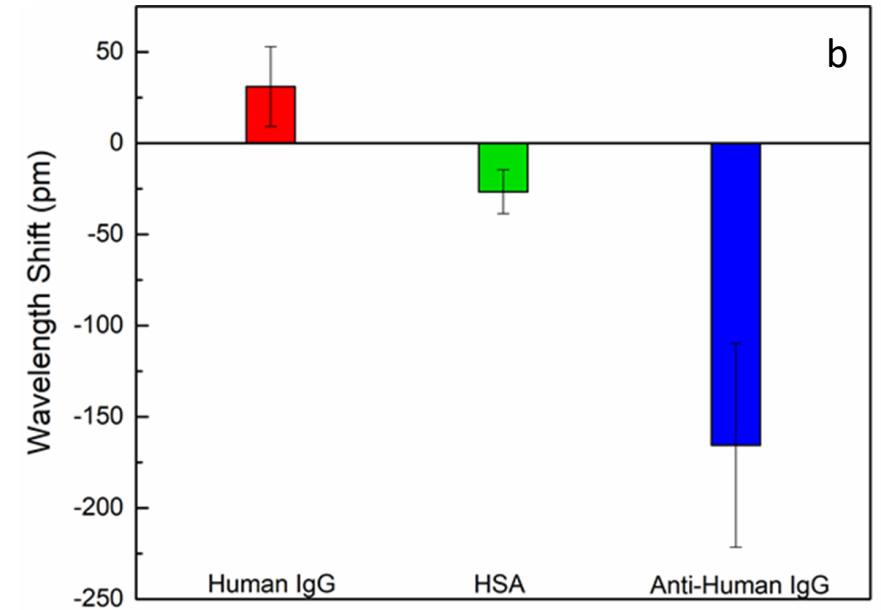
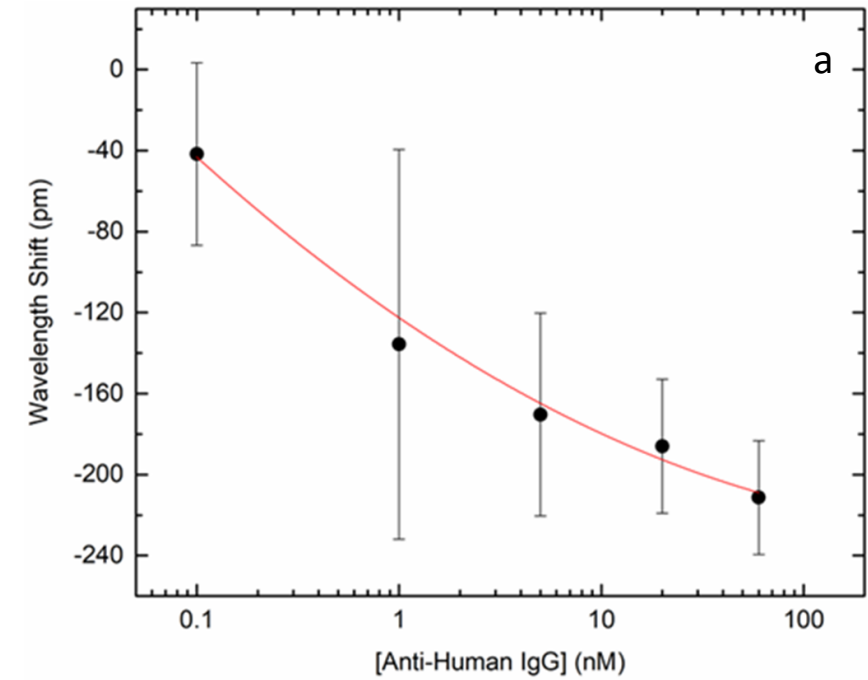
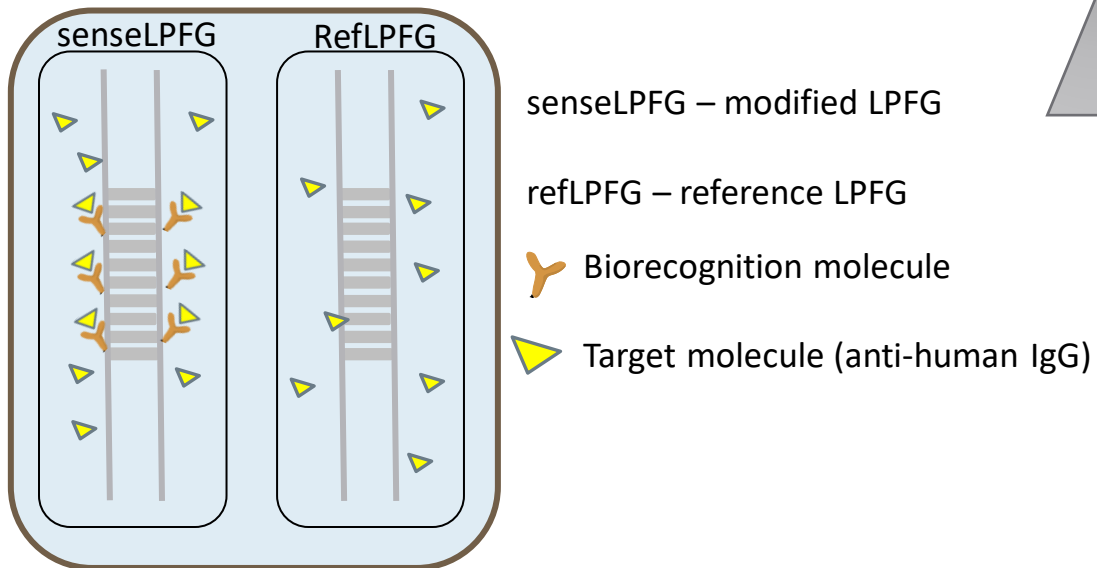
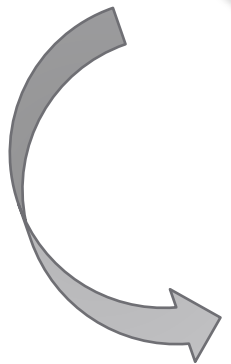
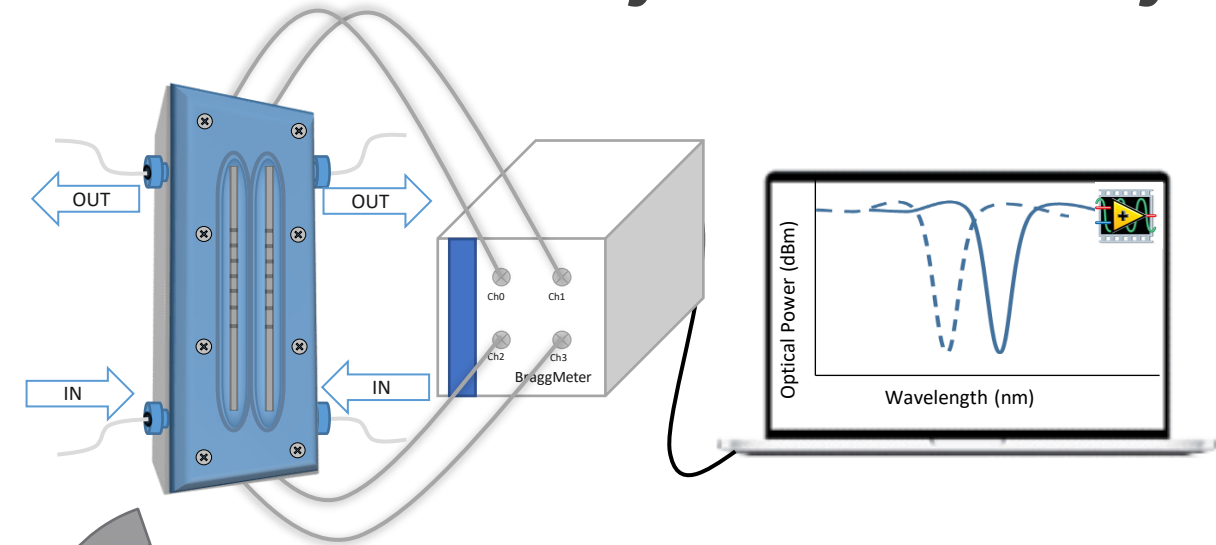
Human IgG
Immobilization
EDC/NHS
Centrifugation
&
Washing



LPFG Surface Modification



Results – Affinity & Selectivity



Conclusions

- ✓ A refractometric platform for biosensing was developed
 - **relevant preliminary results**
- ✓ The protocol for the template carrier molecule production was attested
 - FTIR-ATR spectra
- ✓ LPFG surface modification for biosensing, involving electrostatic interactions, was well succeeded
- ✓ Selectivity of the method was proved
- ✓ Future work
 - **produce highly sensitive and selective LPFG-based biosensors by immobilization of molecularly imprinted polymers using this type of template as a target molecule carrier.**

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Thank You for Watching!!
