

Towards Portable and Simultaneous Gas/Temperature Fiber Optic Point Sensor Interrogator for

Electrical Assets Health Monitoring

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Sensor Interrogator System Overview Patented Distribution Transformer/Utility-Scale Battery Optical connection **Energy Harvesting Circuit** Wireless connection Power Source Power **Fransmission** Plasmonic Fiber Optic **Light Source** Wireless Transceiver Set

Sensing Layer Materials Development

200°C

--300°C

--400°C

-500°C

700 750

650

Optical Waveguide Modeling Simulated Temperature Dependence of Au/SiO2 Au/TiO₂ Reflection Sensor Reflection Sensor 115 98 ž 105 96 र्हे 100 🥻 92 "100°C

450 500

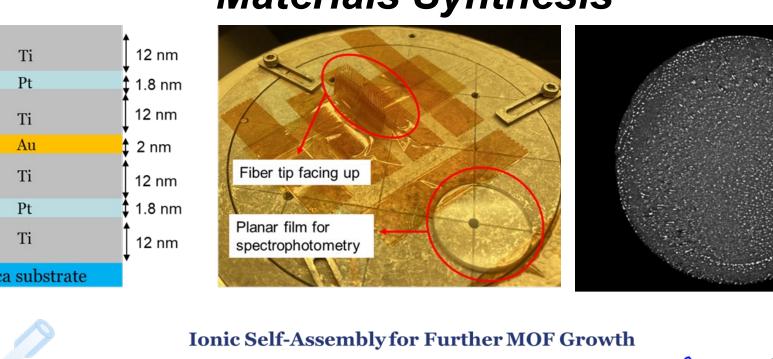
550 600

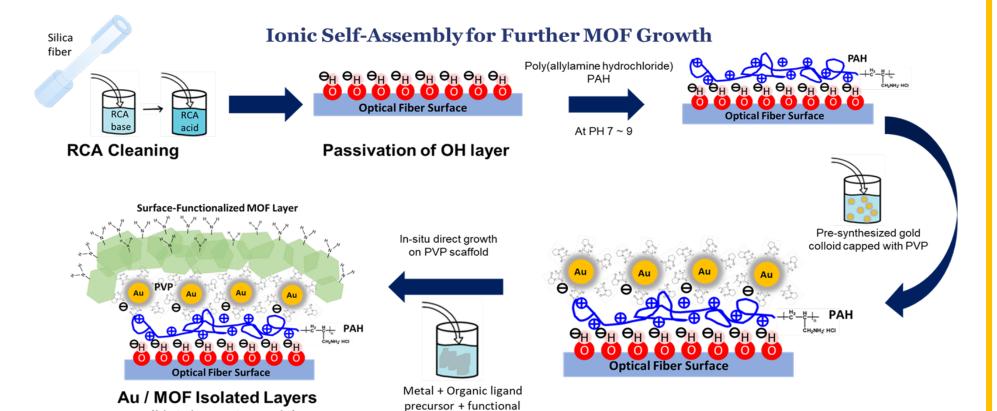
Wavelength(nm)

440 470 500 530 560 590 620 650

Wavelength(nm)

Materials Synthesis



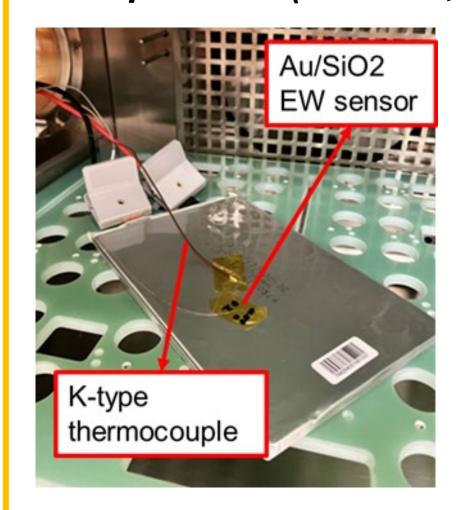


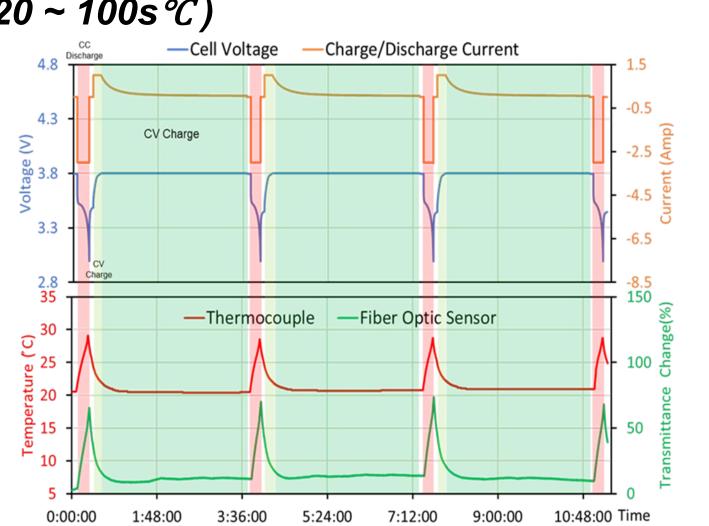
group methanolic solution

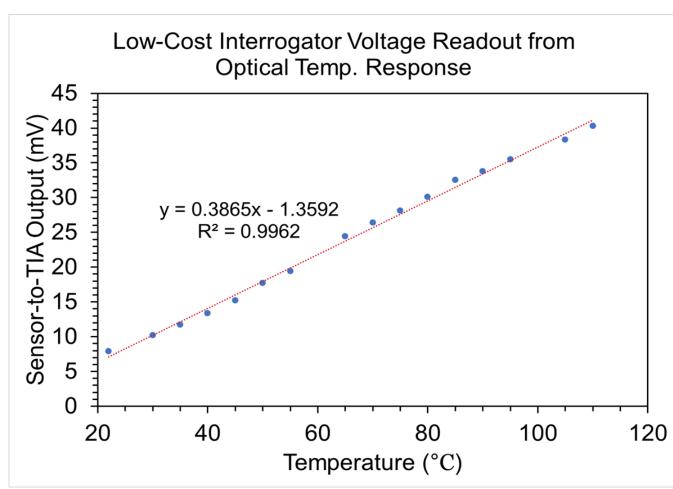
(Not drawn to scale)

Sensor Dynamic Response and Calibration

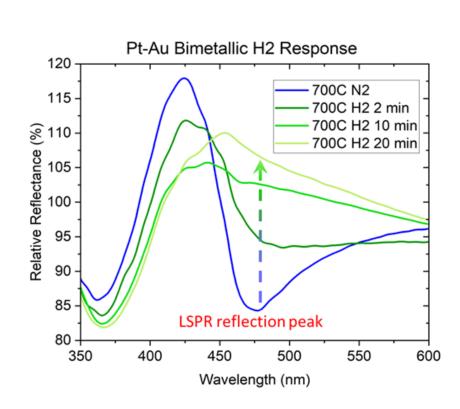
Temperature (Au/SiO2, 20 ~ 100s \mathscr{C})

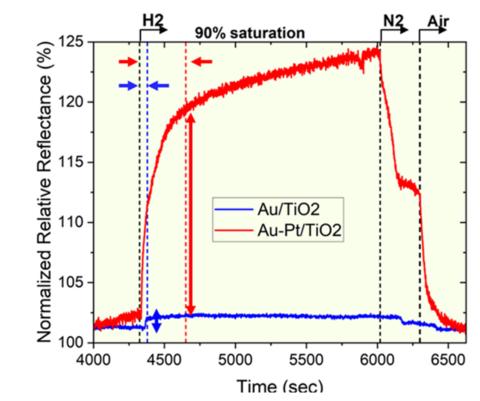


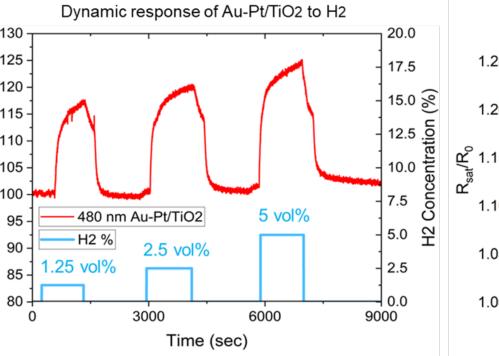


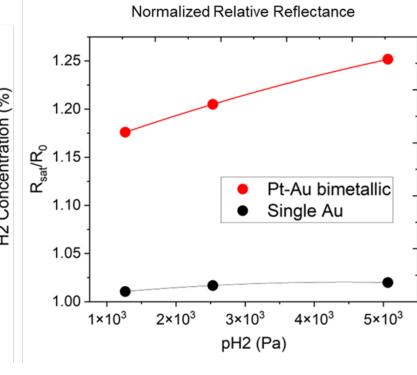


Extreme Environment H2 (Au-Pt/TiO2, 700℃)









Temp. Cross-Sensitivity with CO2 (Au/ZIF-8, 20 - 70 ℃)

