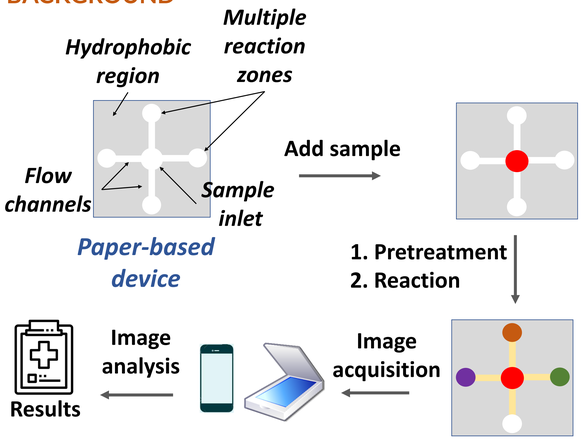
Title: *Fully enclosed paper-based device using plasma processes*

PRESENTER:
Nikhil Raj

BACKGROUND



Sample testing procedure using paper-based sensors

Microfluidics paper based analytical devices (μ-PADs) offer many advantages:

- ✓ Low-cost and biodegradable devices
- ✓ Does not require external power
- ✓ Heavy-equipment free

PROBLEM STATEMENT

Traditional μ-PADs are open to the atmosphere which can lead to following issues:

- × Sample contamination
- × Loss of sample due to evaporation
- × Difficulty in device handling

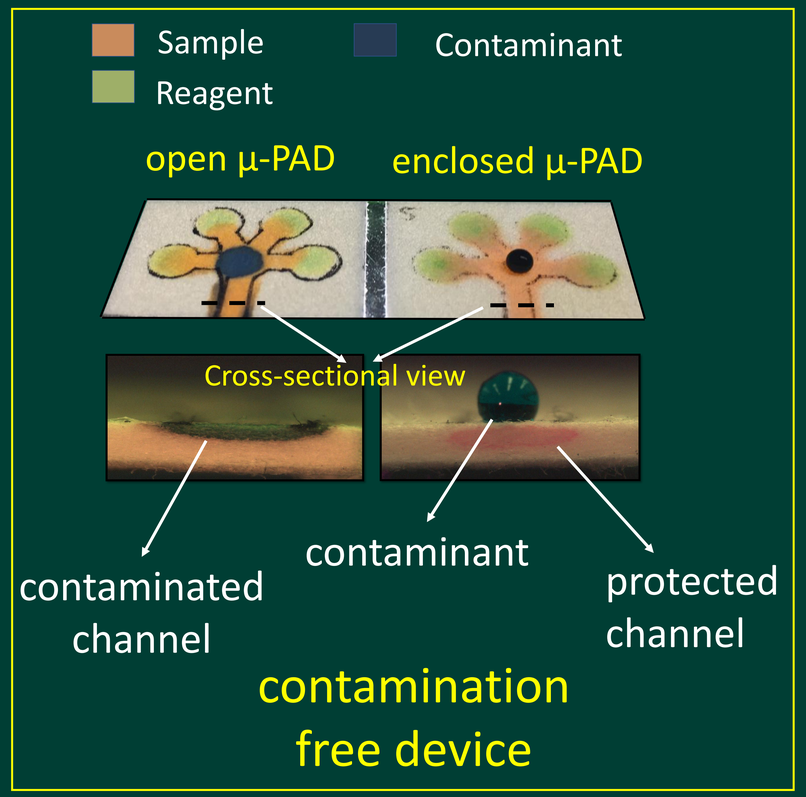
RESULTS

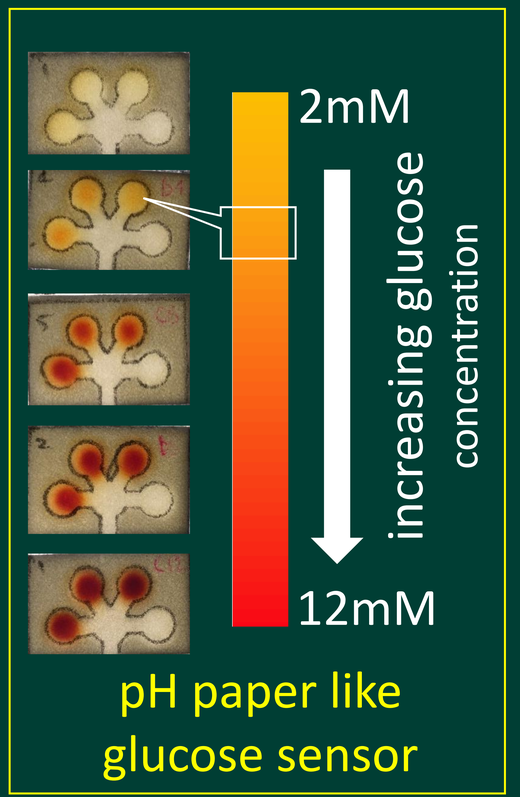
- Using simple process of pentafluoroethane (PFE) plasma deposition followed O_2 plasma etching, fully enclosed μ-PADs are fabricated.
- Flow channels are protected by layers of hydrophobized paper to **inhibit contamination**.
- μ-PADs are easily packaged using transparent tape to **reduce sample evaporation**
- Finally, we demonstrated the working of the device by designing a **glucose sensor** which is a key analyte in diagnosing diabetes.

CONCLUSION

Unlike traditional open μ-PADs, enclosed μ-PADs are more suitable for field applications because they are less prone to contamination and sample evaporation.

Fully enclosed paper-based sensors are more suitable on field for **low-cost** disease diagnostics





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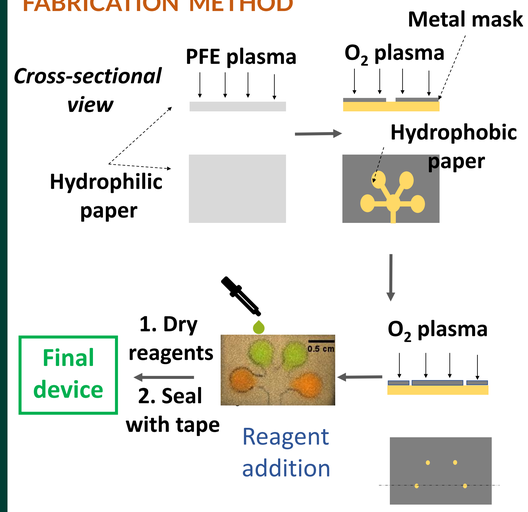
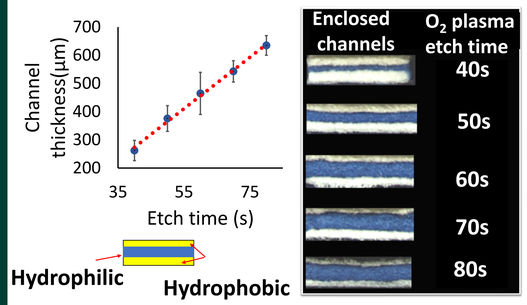
FABRICATION METHOD

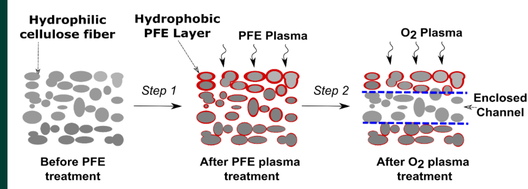


EXPLANATION



Cross-sectional view

Effect of oxygen plasma etching time on channel thickness



Cross-sectional view

Physics of channel making

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