

Full Color Reflective Display

Based on High Contrast Gratings

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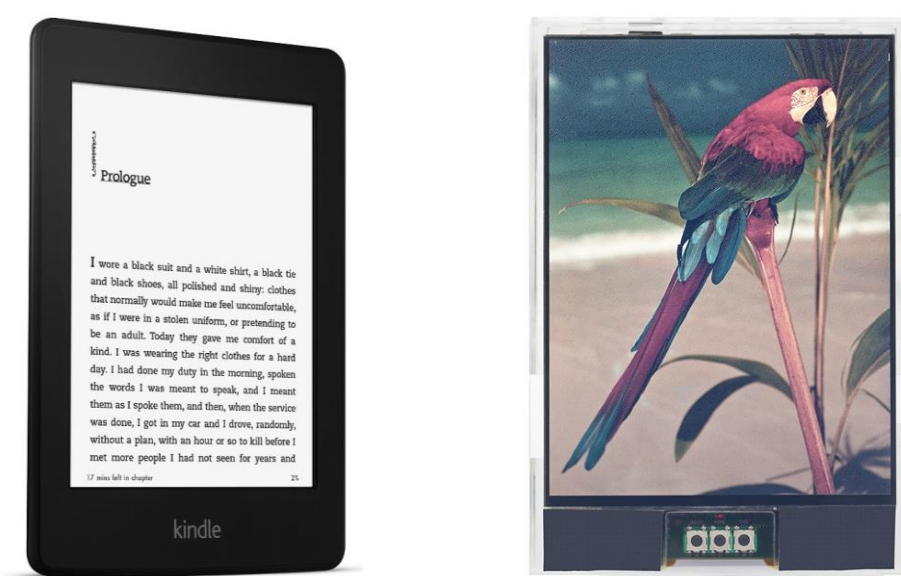
Reflective Display

Advantages

- Sunlight readability
- Printing-like
- Low power consumption

Challenges

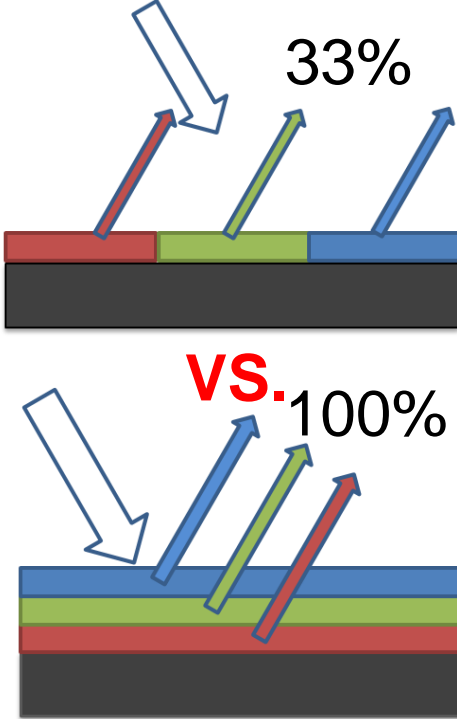
- Brightness
- Gamut
- Contrast Ratio



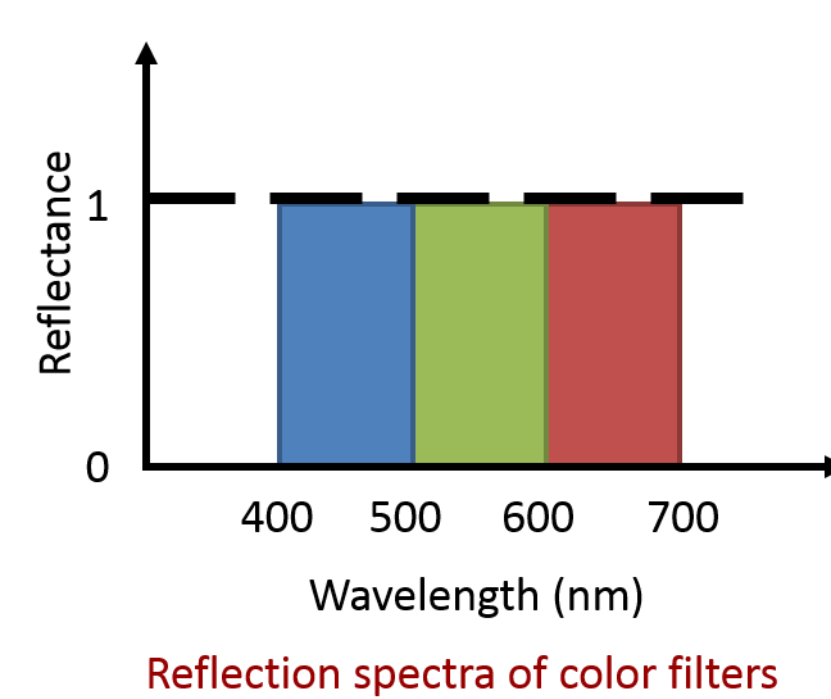
<https://kindle.amazon.com/> Japan Display Inc.

Design

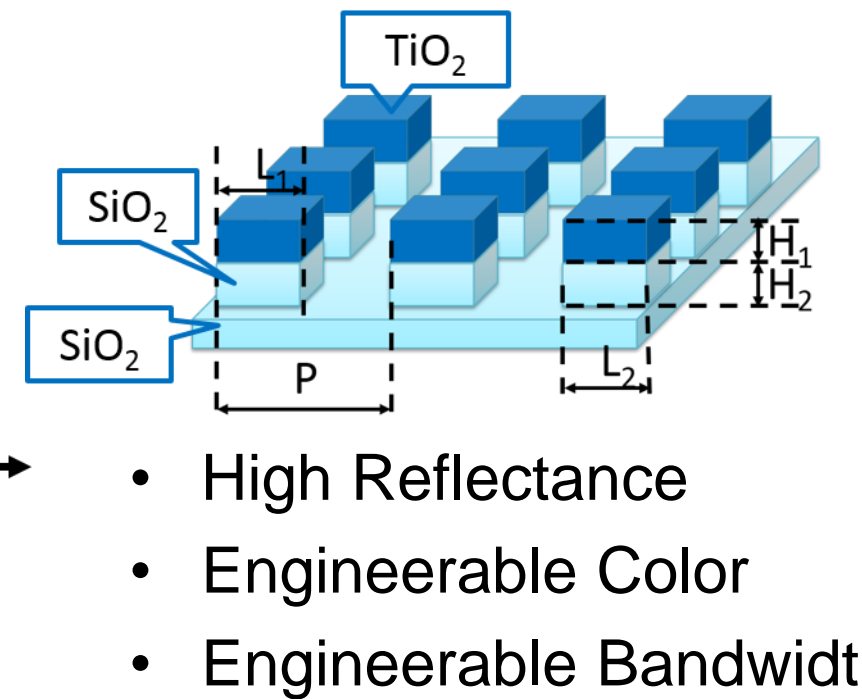
Architectures



Ideal Reflection Spectra



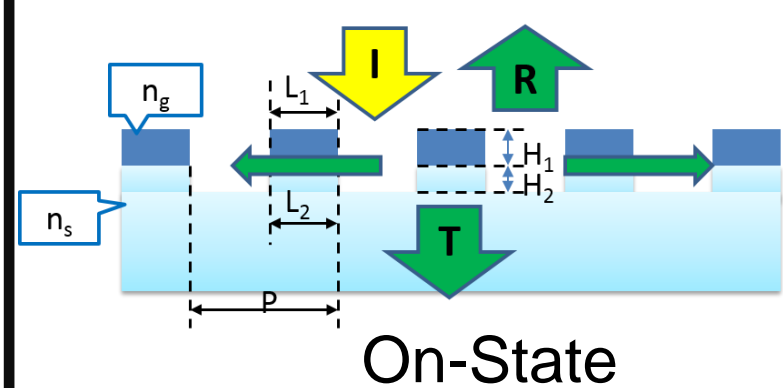
2D HCG Color Filter Design



- High Reflectance
- Engineerable Color
- Engineerable Bandwidth

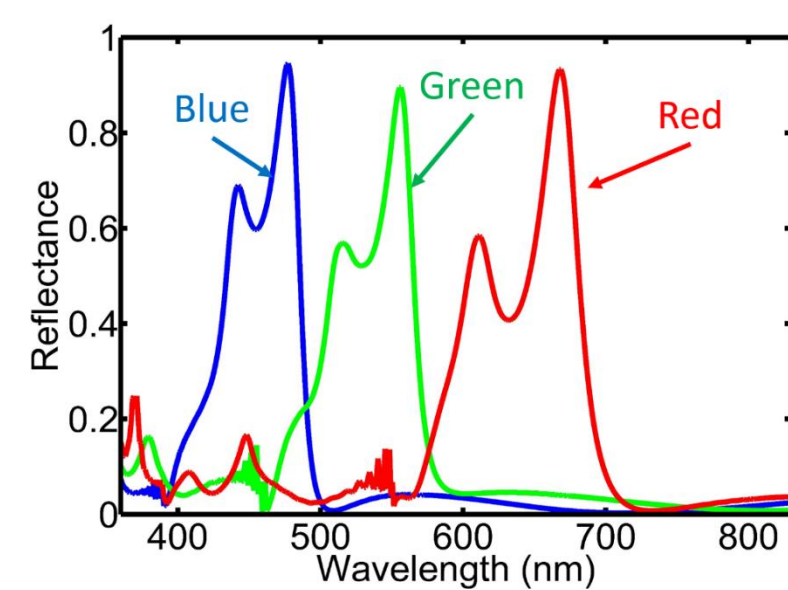
Simulation

Simulation Setup

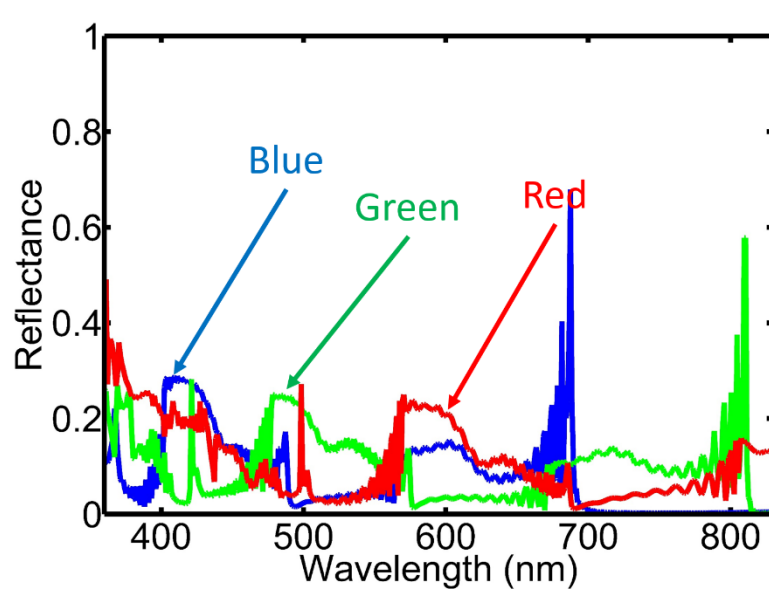


- Resonance & Interference
- Finite-Difference Time-Domain
- 300 nm – 500 nm
- Angle Sensitivity

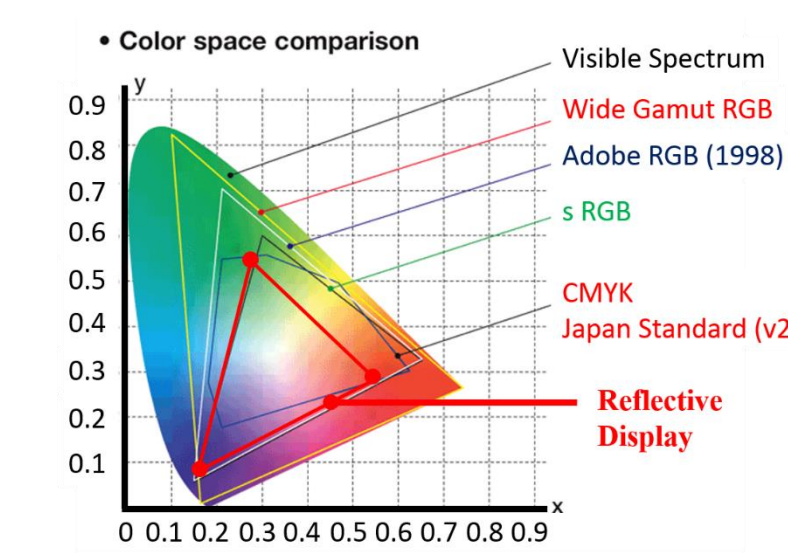
On-State



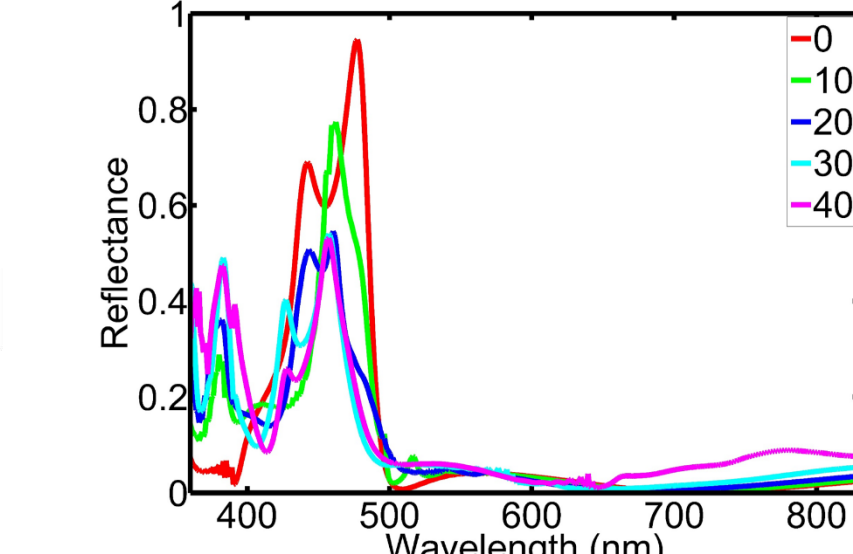
Off-State



Gamut

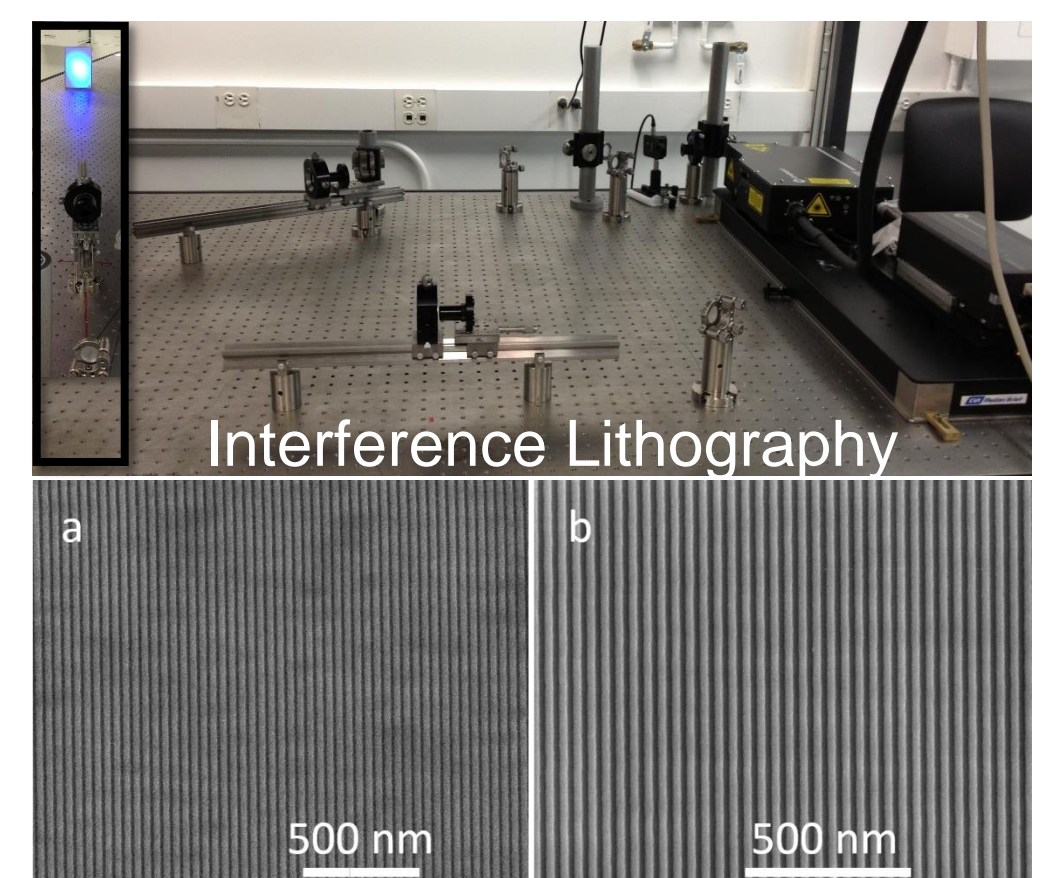
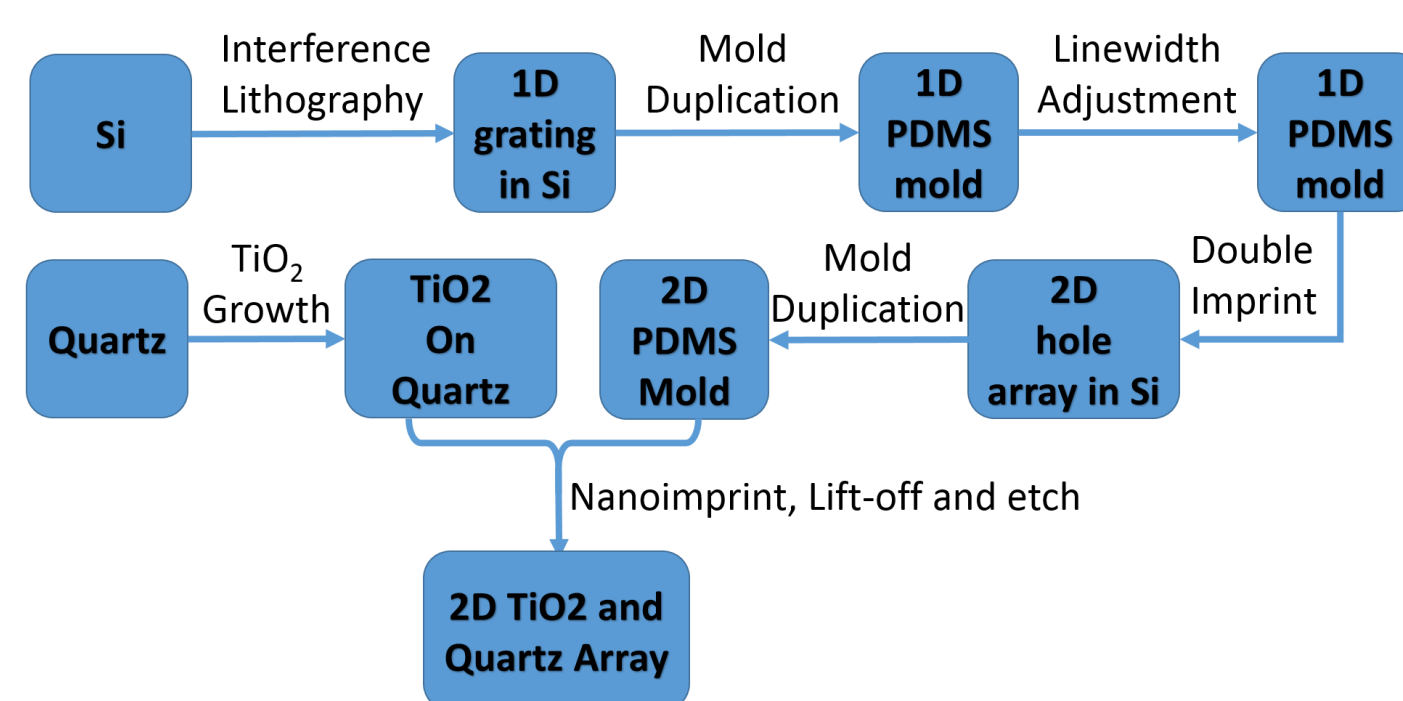


Angle Dependency

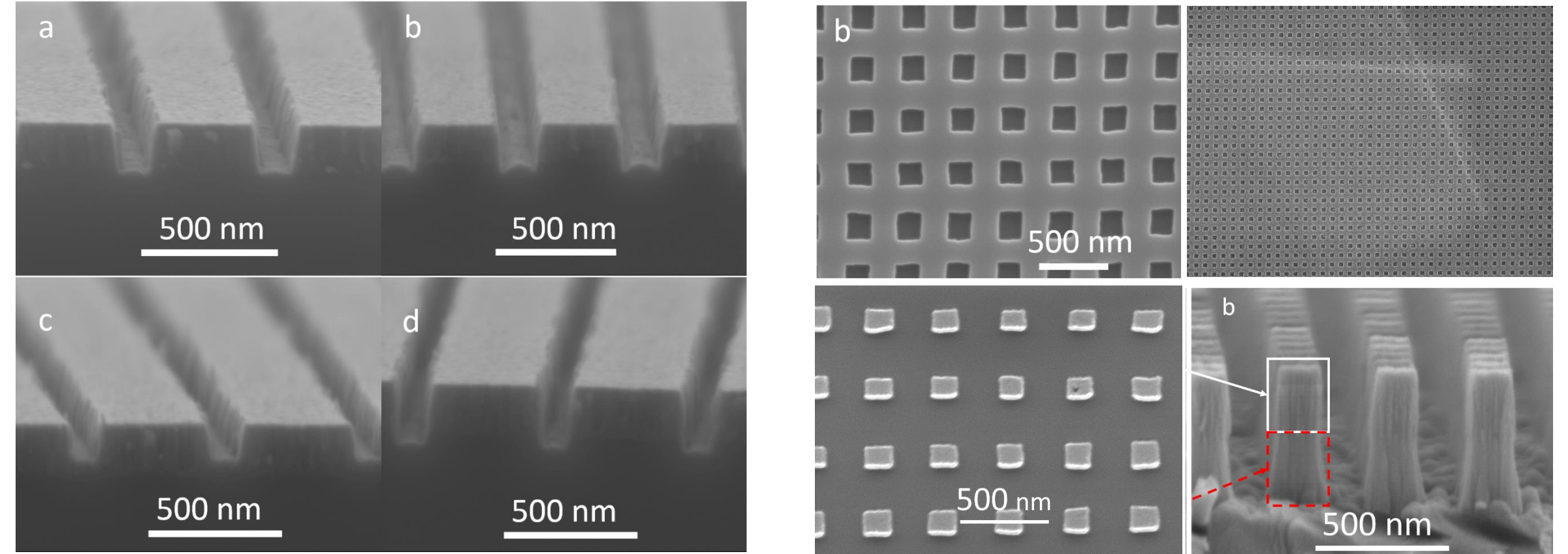


Fabrication

Fabrication Flow Chart

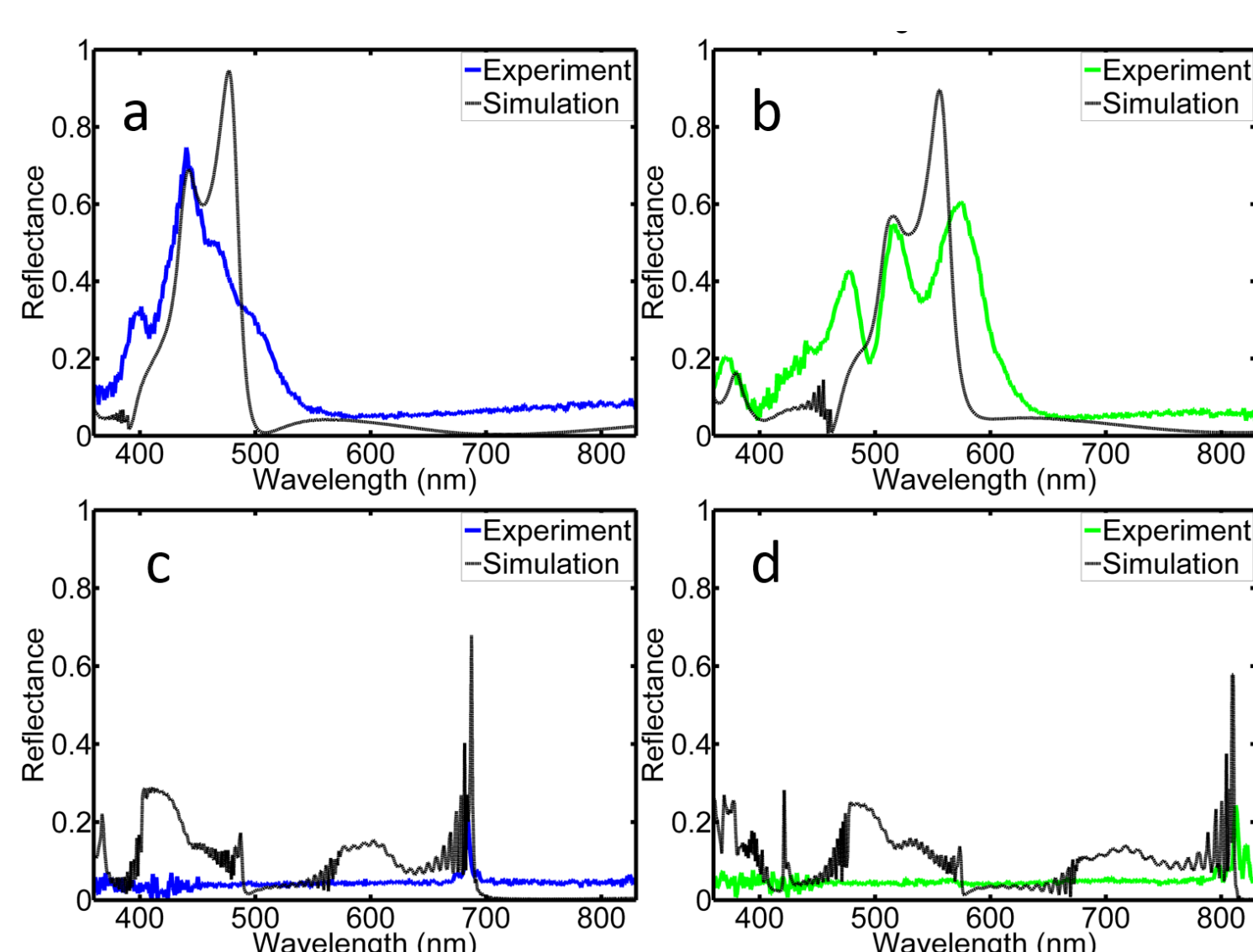


Fabrication Recipes Optimization



Discussion & Future Work

Measured Reflection Spectra



Filter Photos

