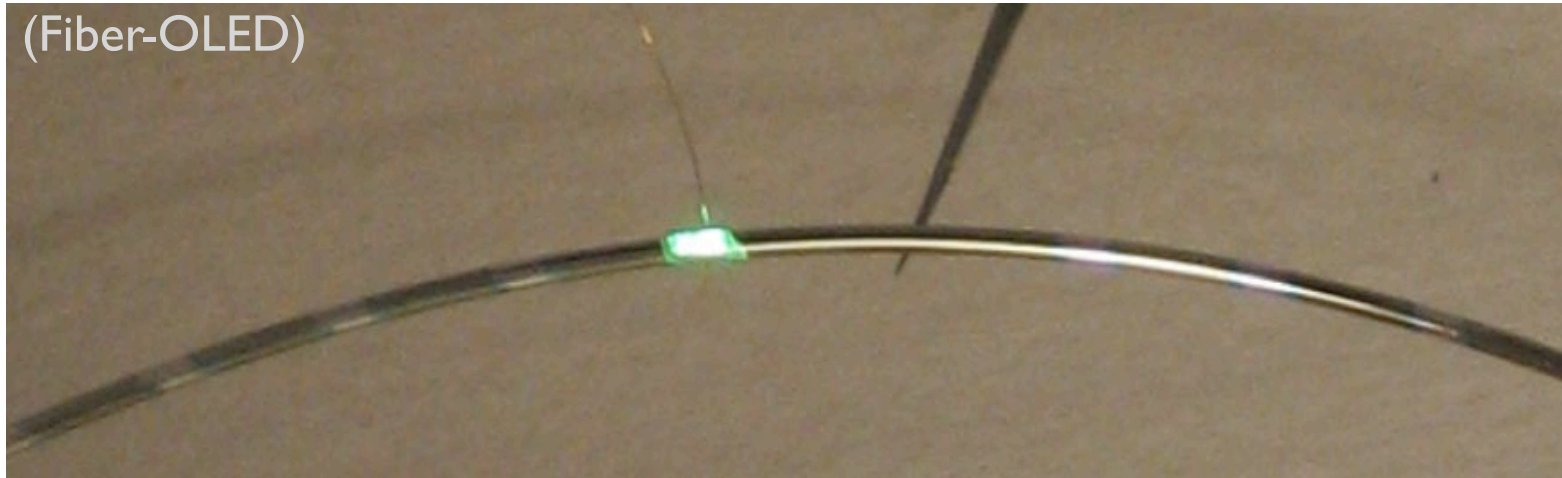


Multi-Functional Fabrics for Energy Conversion

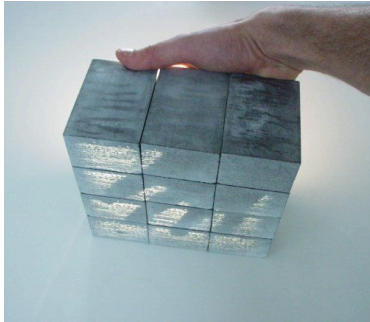
Max Shtein (MSE, ChE) & Kevin Pipe (ME, EE)
Abhishek Yadav, Brendan O'Connor

(Fiber-OLED)



Laboratory for Nanostructured
Energy Conversion Devices

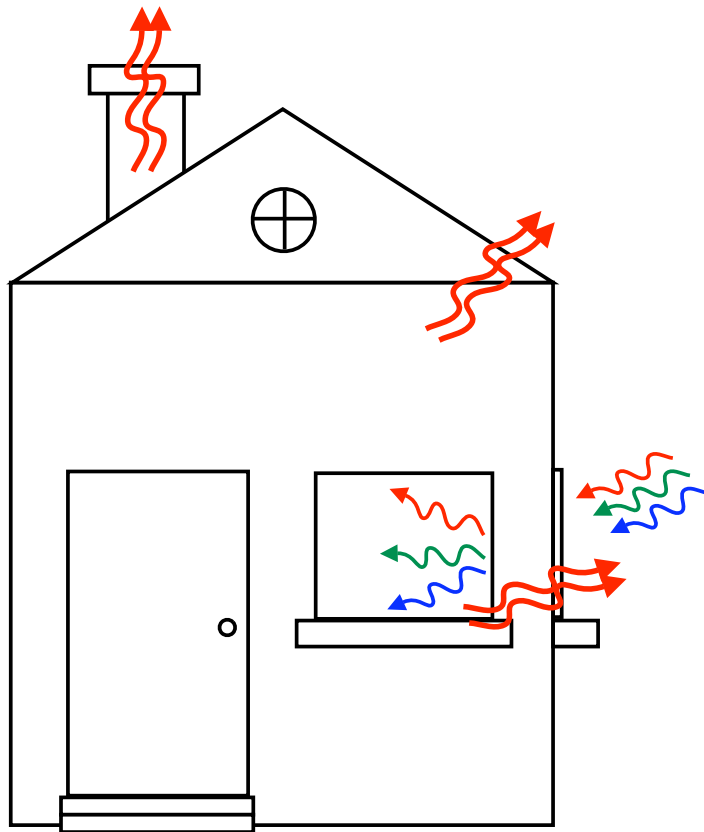




Energy harvesting composites 2



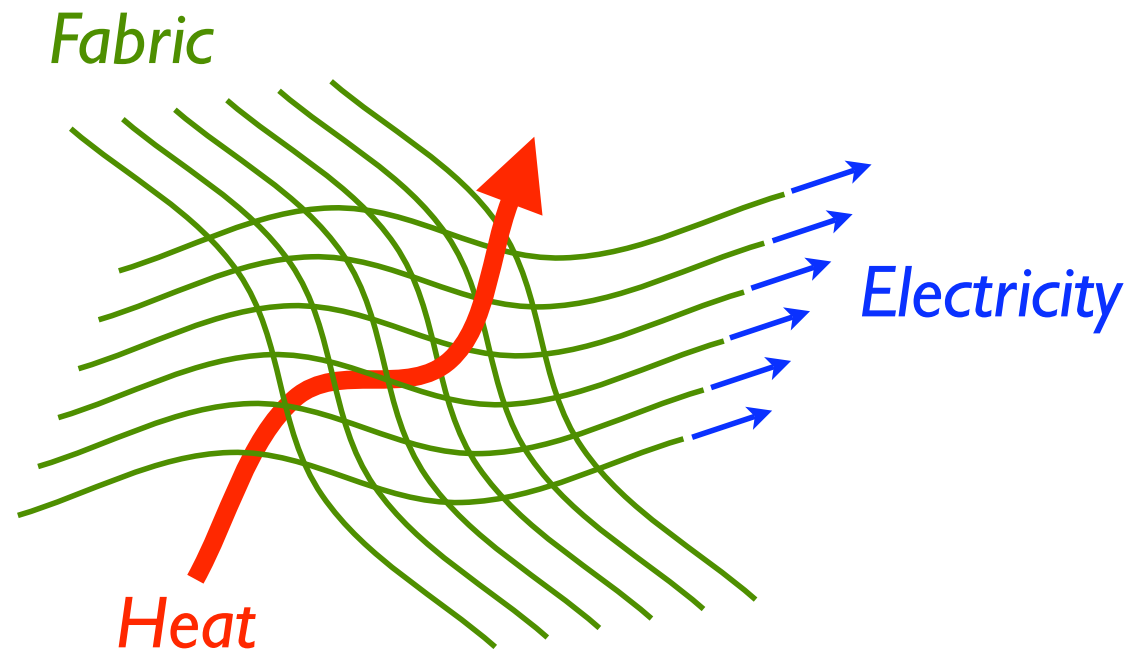
Energy harvesting building materials



Energy harvesting textiles



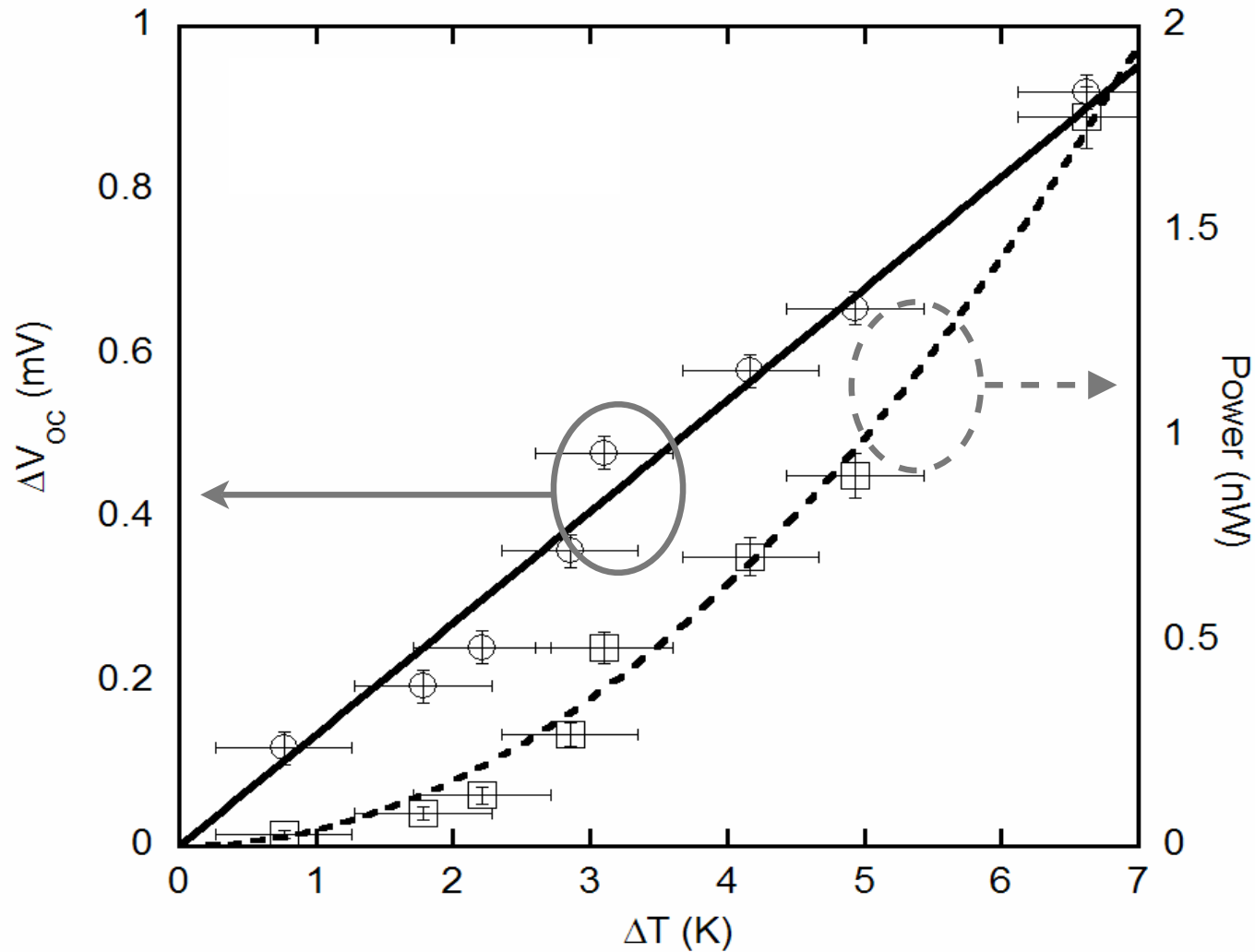
- Fibers that:
1. convert heat to electricity
 2. refrigerate



“Thermoelectric Fibers”

Patent Pending

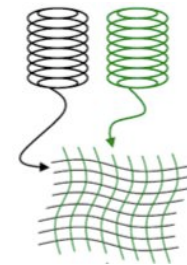
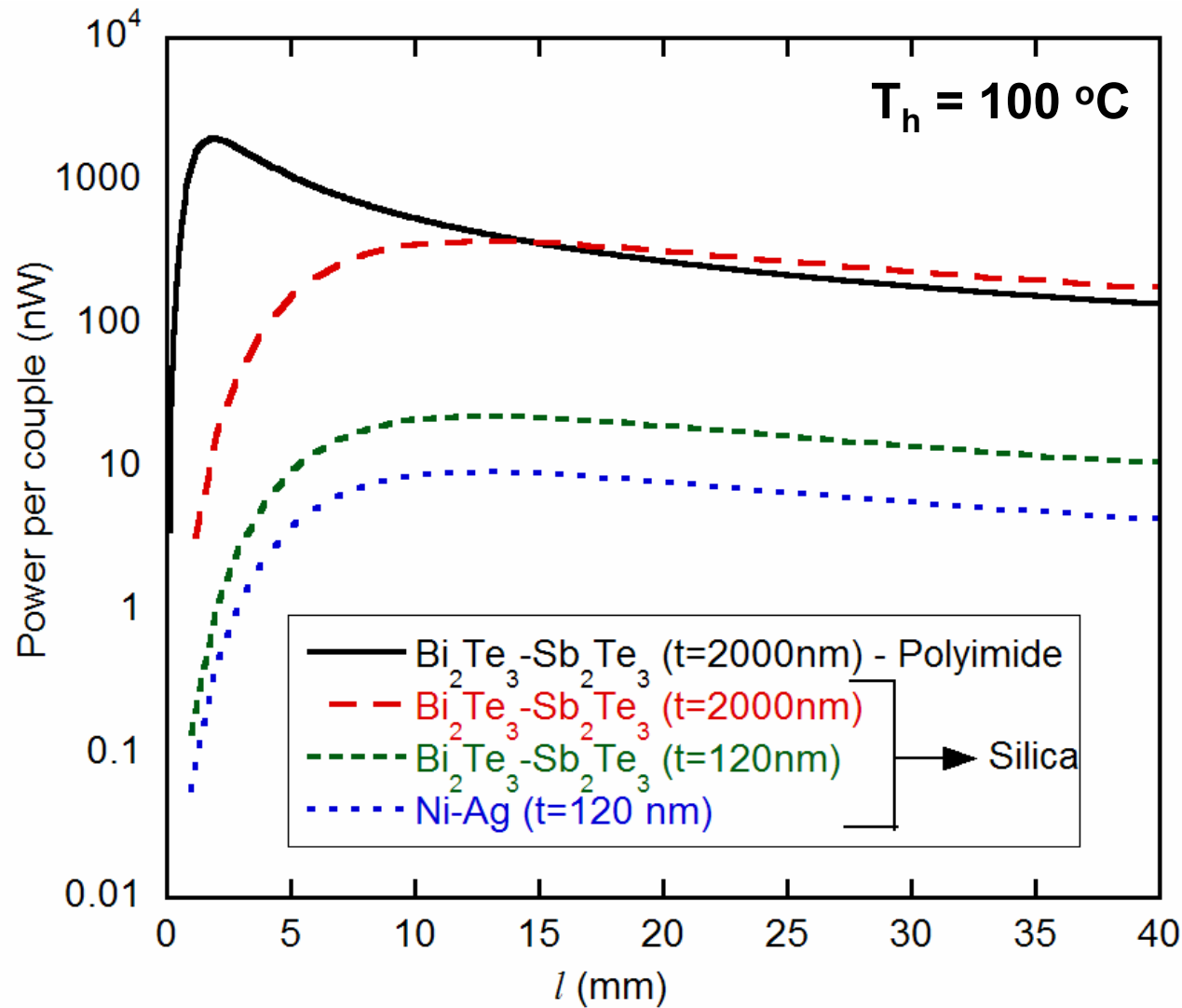
Individual thermoelectric fiber prototypes



Patent Pending

Manuscript in press

Planned: Semiconductor-based thermoelectric fibers & fabrics

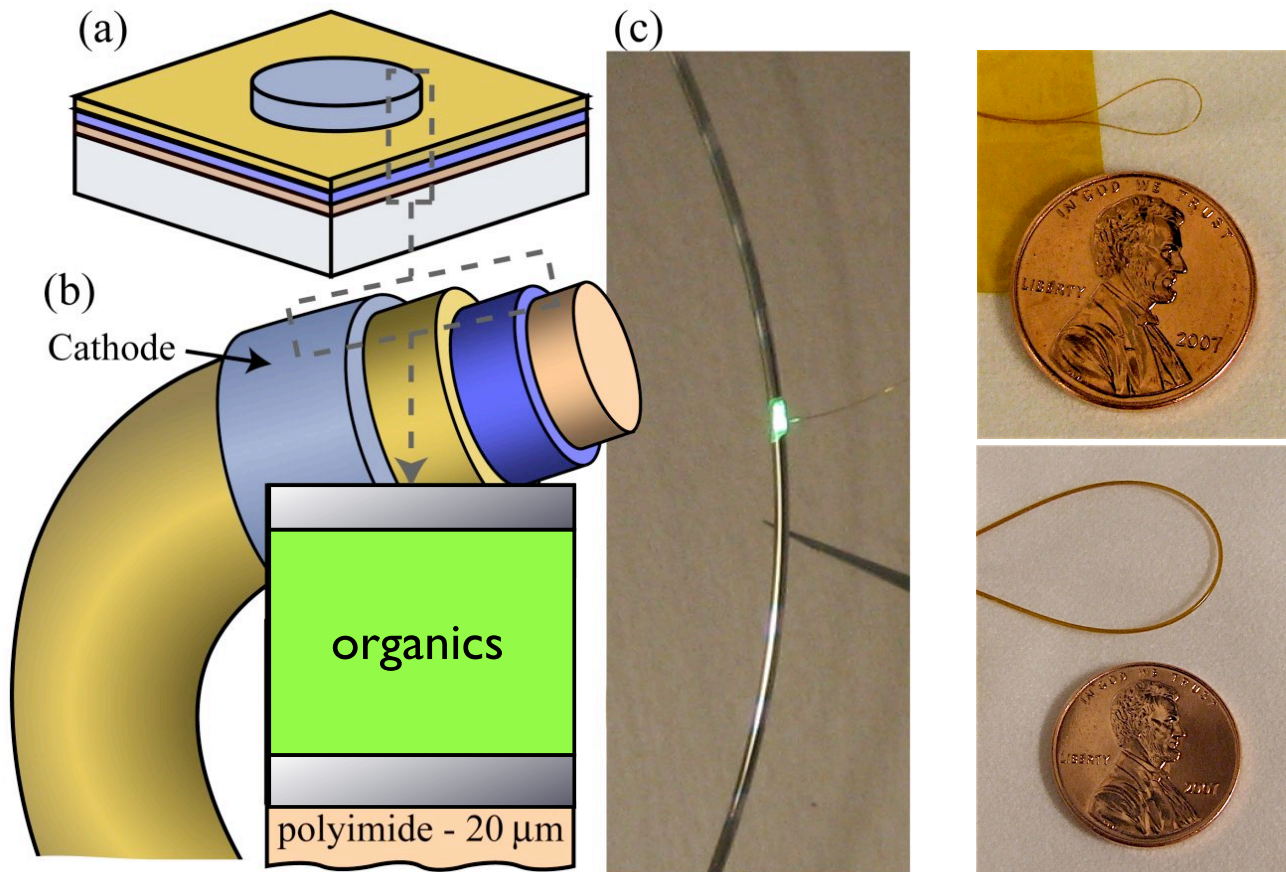


Potentially
capable of
producing
 $\sim 10\text{ mW} / \text{in}^2$

Patent Pending

Manuscript in press

Organic LED Fibers

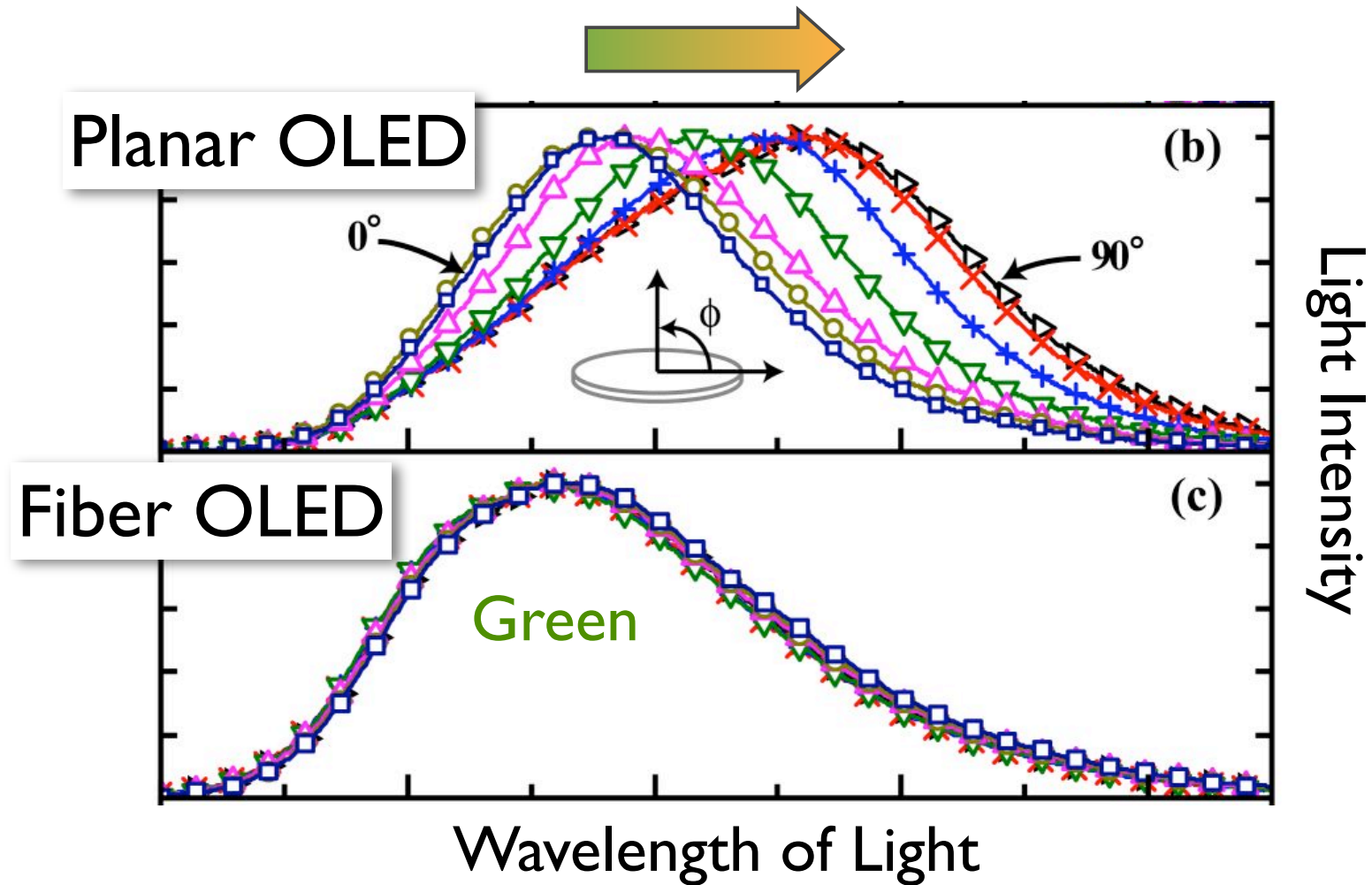


Active coating = $1/1,000$ of fiber thickness

Patented

Manuscript in press

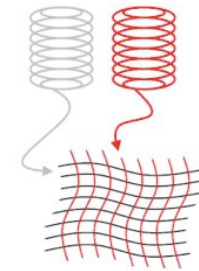
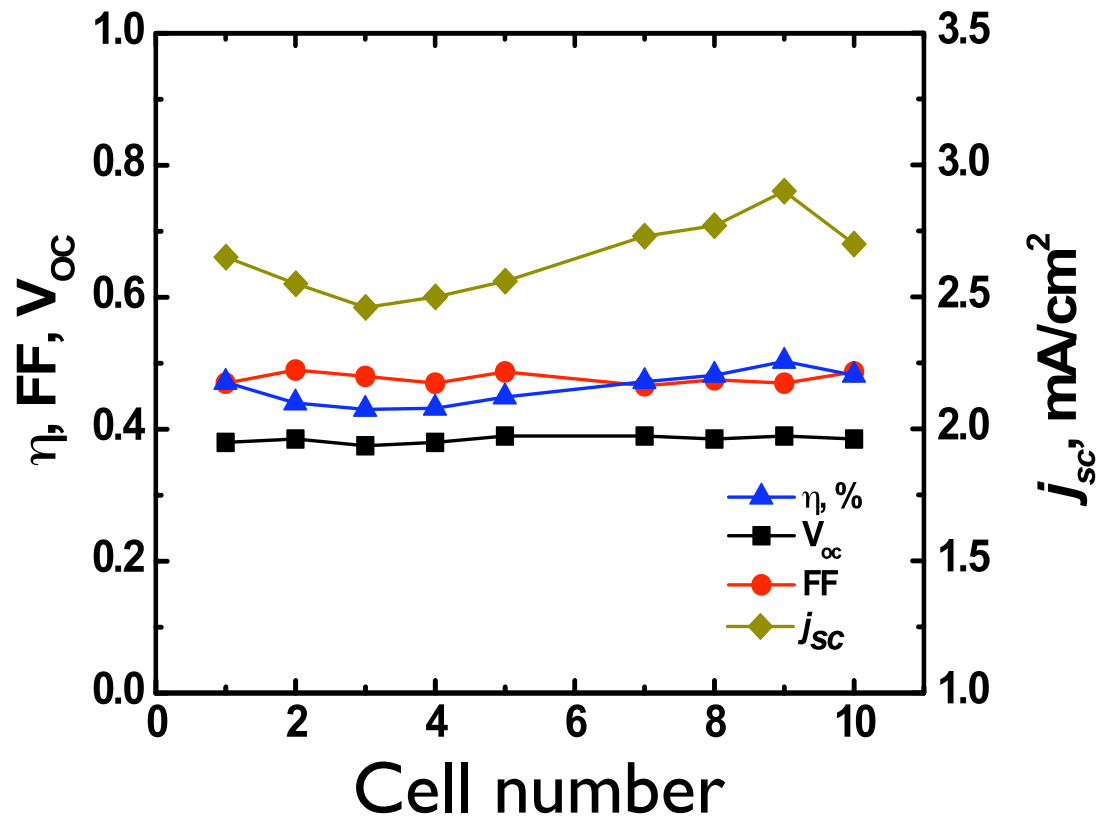
Fiber OLEDs have uniform color output



Patent Pending

Manuscript in press

Photovoltaic (solar cell) fibers and fabrics: Initial Results

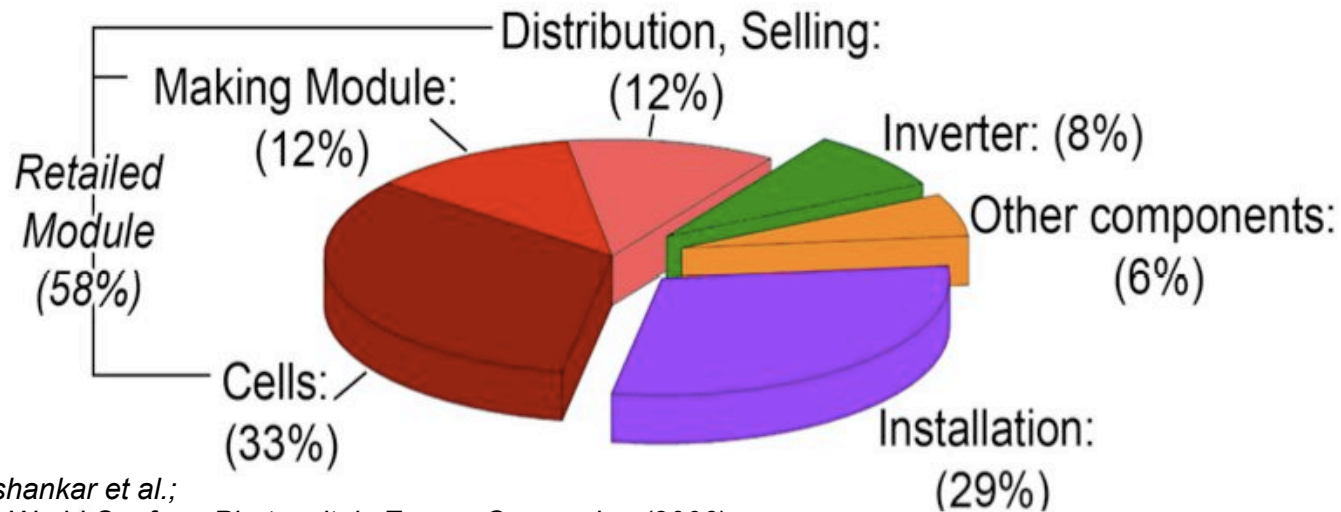


Potentially
capable of
producing
 $\sim 10 \text{ mW} / \text{in}^2$

Patented

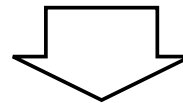
Manuscript in press

Cost of PV in detail:



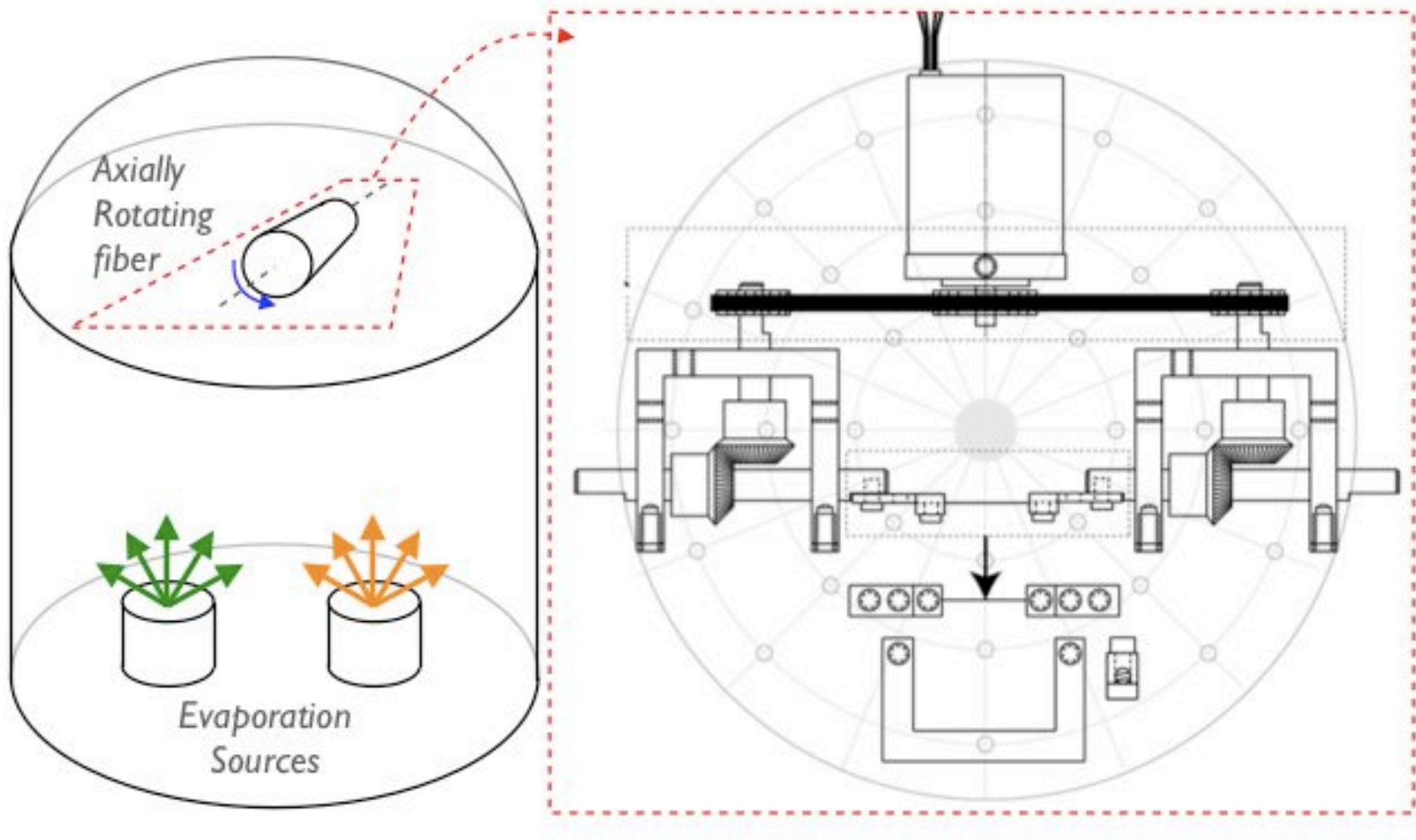
V. Gowrishankar et al.;
Proc. 4th World Conf. on Photovoltaic Energy Conversion (2006)

Total cost: 8.5 \$/W_{peak}
(Excluding subsidies and incentives)

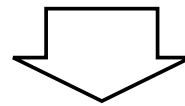
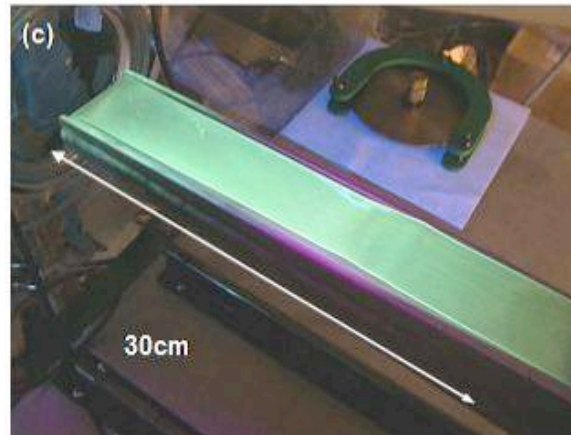
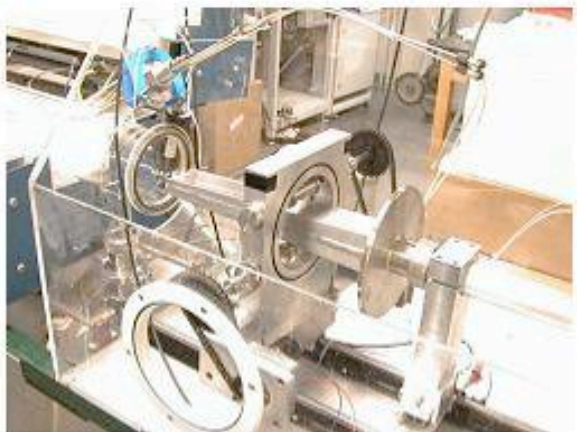


Fiber-based solar cells enable integration by textile processing,
reducing both Module & Installation costs

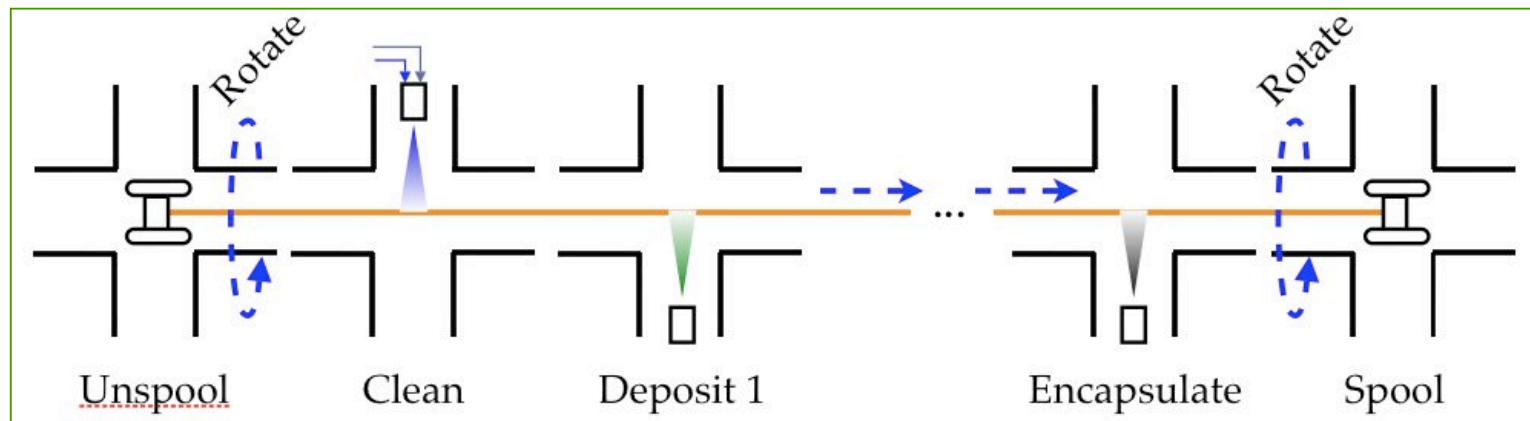
Current (batch) fabrication technique



Scalable fabrication techniques tested previously



& will be applied to fibers



Example: Targeted applications in aerospace

