

Large Area Spray Coated TCs for Solar Cells

Using Low Cost Airbrush and Raspberry Pi

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Abstract

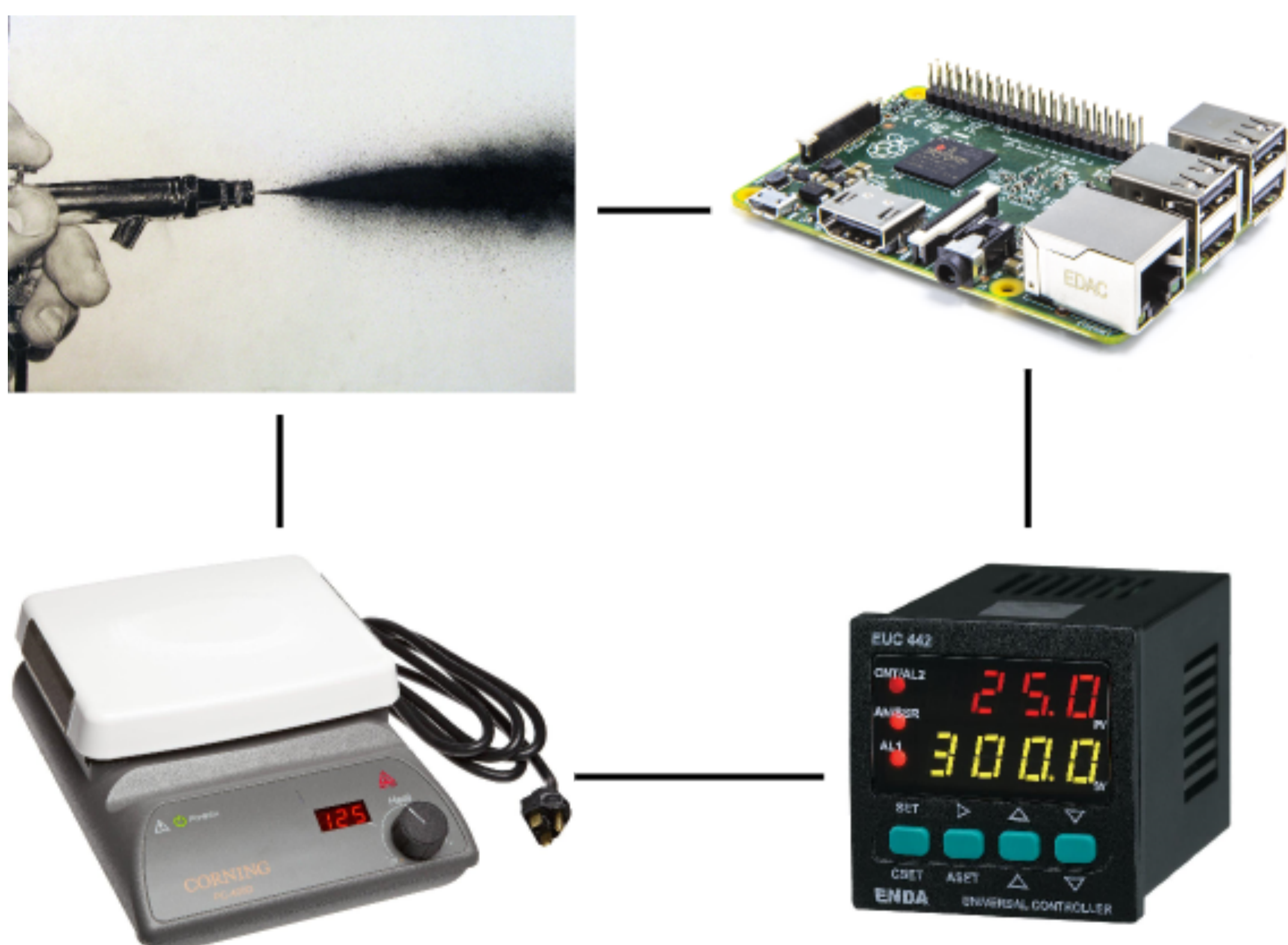
Flexible solar cells are limited by poor performance due to resistive, difficult to manufacture, and costly flexible transparent conductors (TCs).

Cost-effective (<\$0.03/cm²) deposition methods would enable:

- Building integrated solar technology
- Light weight, portable solar cells
- Flexible, durable solar cells
- Flexible displays
- Flexible circuits
- Low scale, point manufacturing

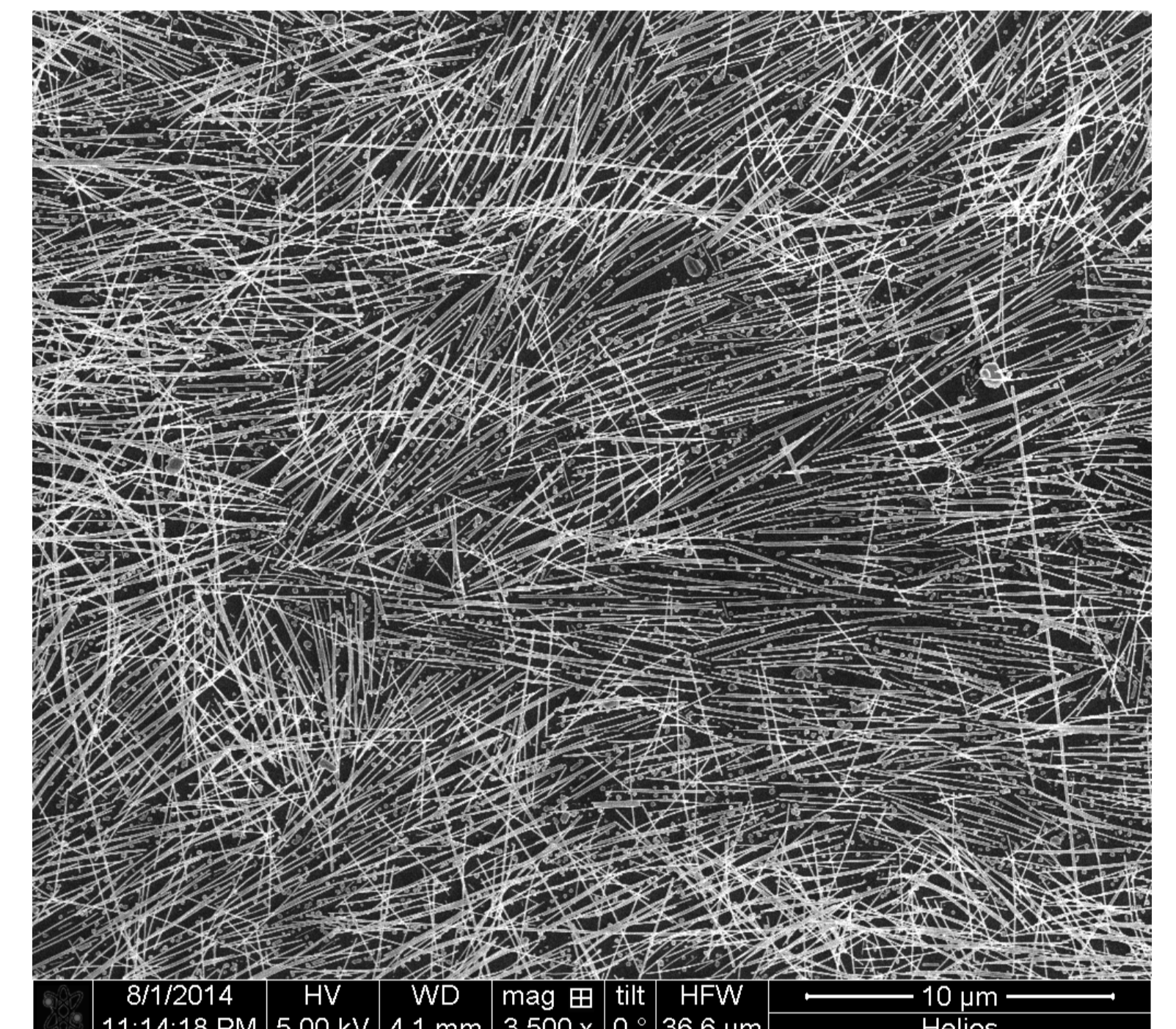
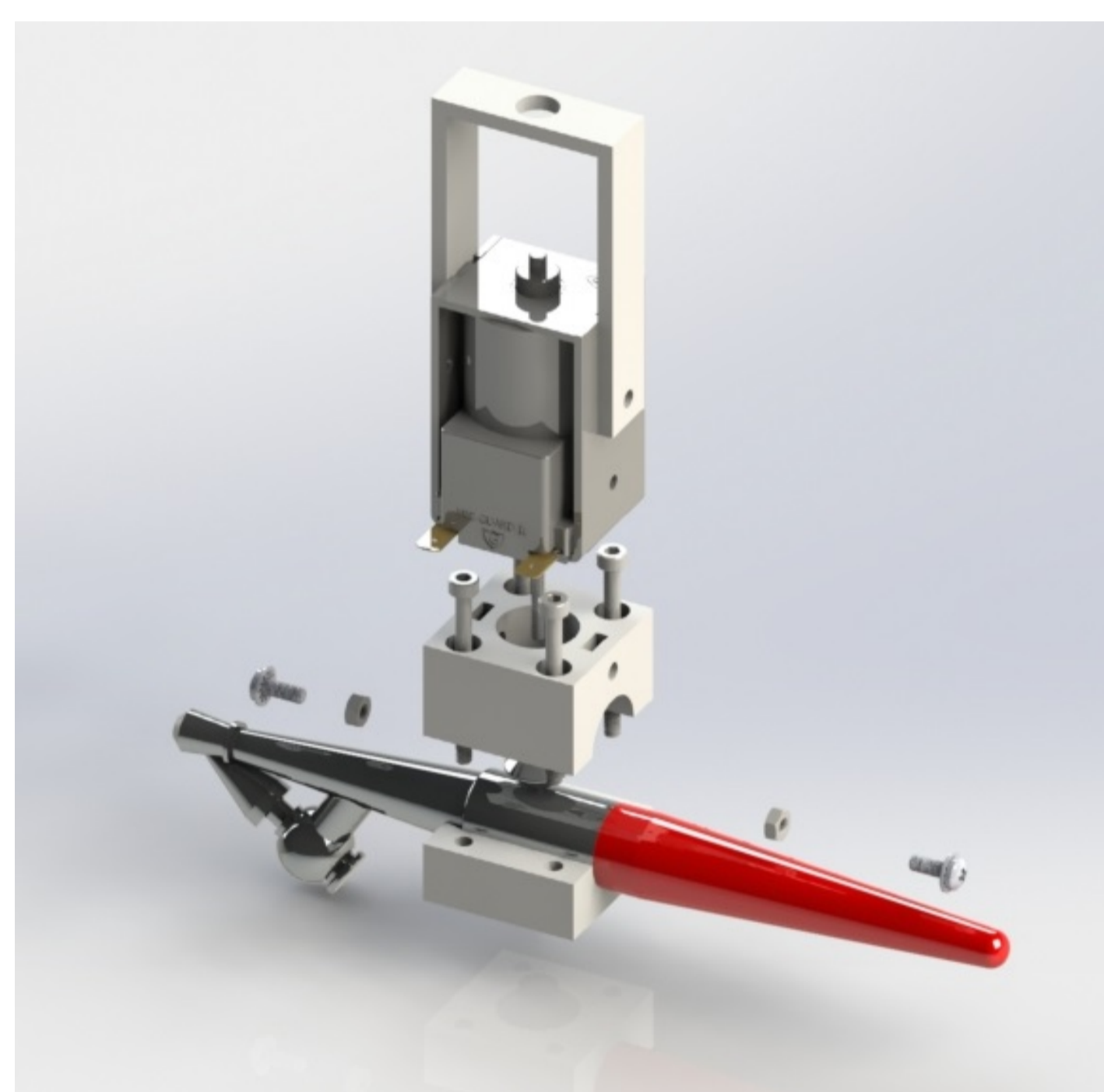
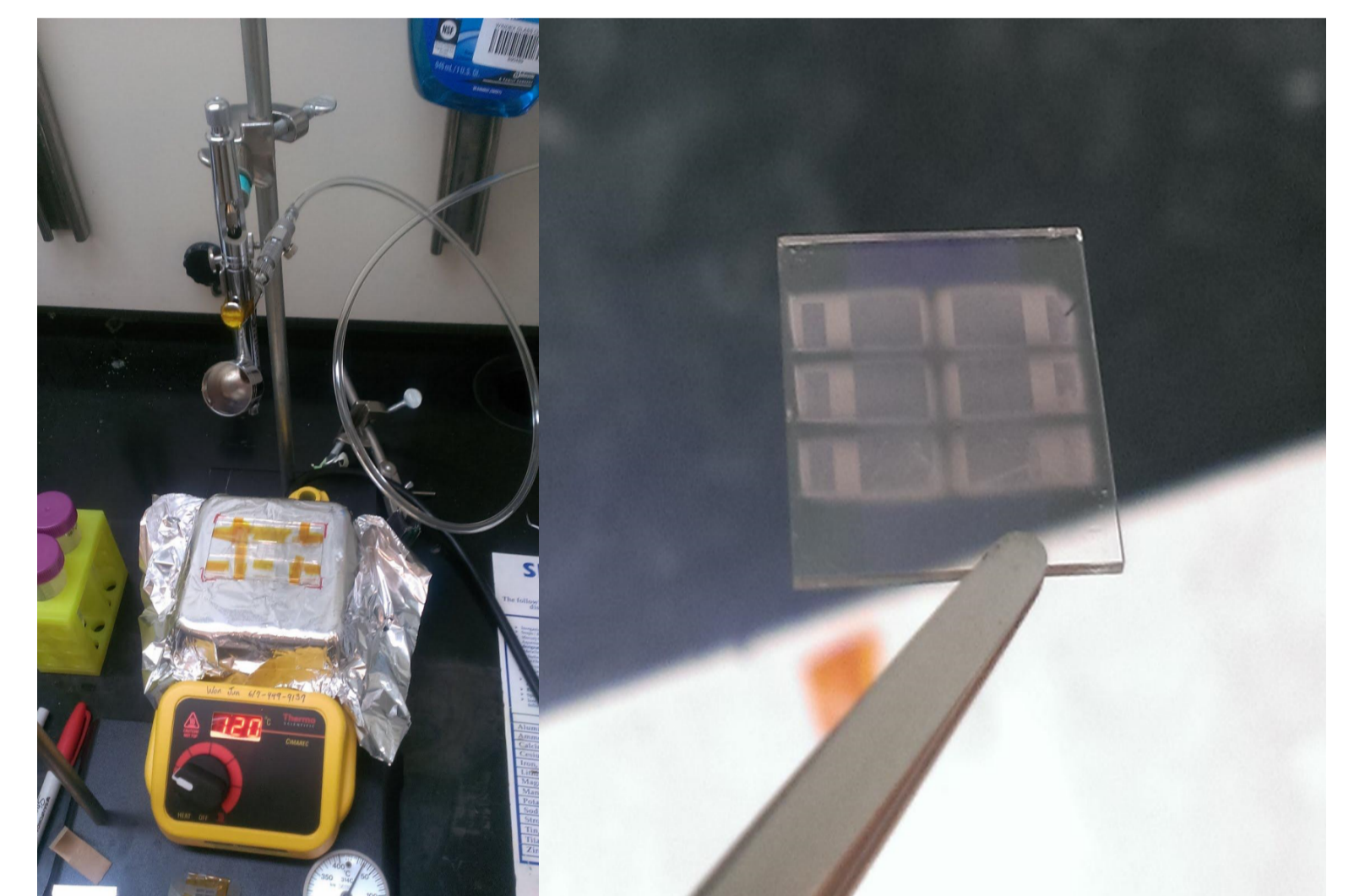
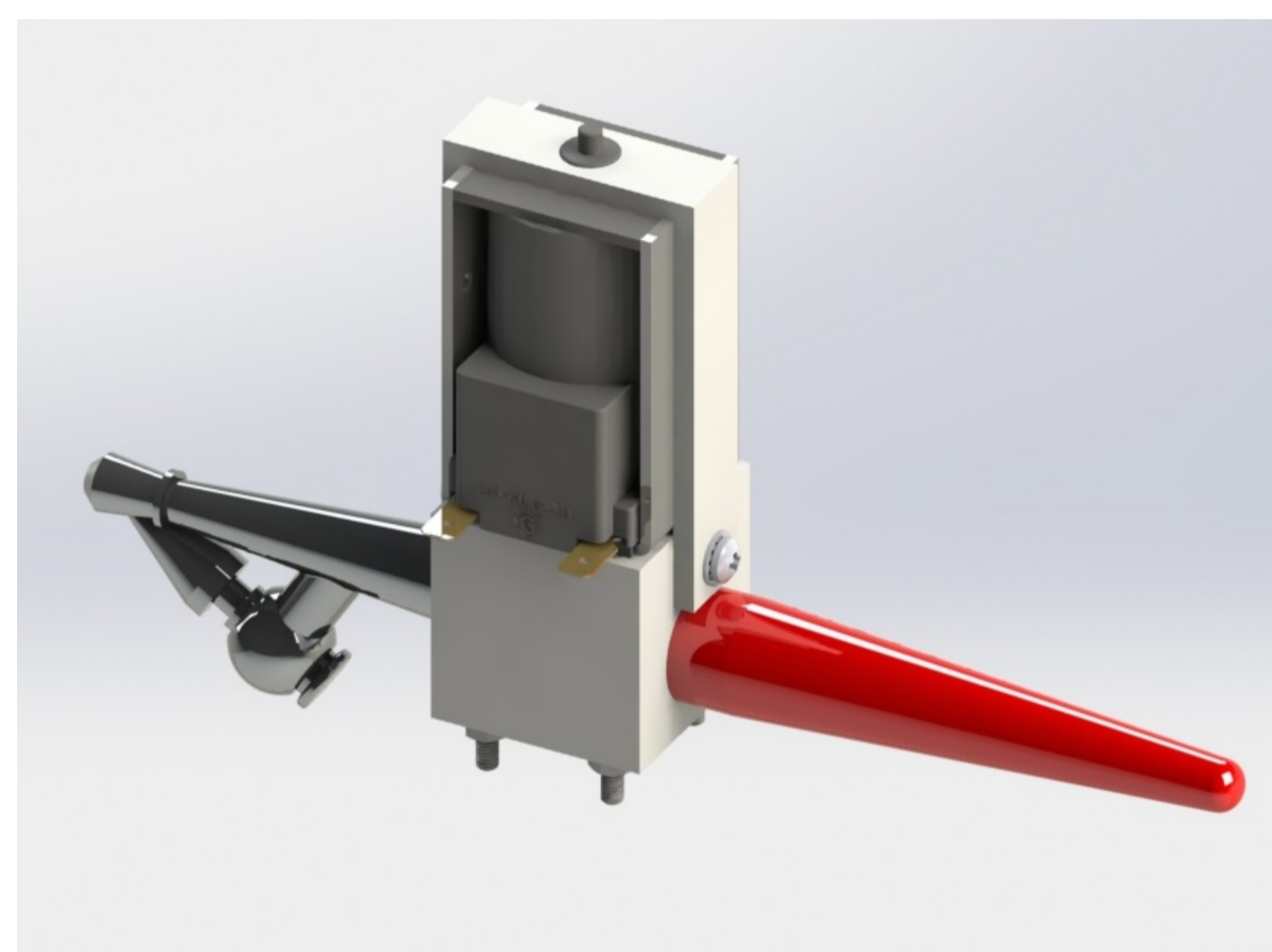
Proposed Solution

A cost-effective method of depositing TCs using common parts and a low cost microcontroller.



Prototype

- Nanowire can be patterned in 2D via spray coating deposition
- Electronic control gives more repeatable control



Next Steps

- Demonstrate cost-effective manufacturing of silver and copper nanowire films
- Determine scattering and optical properties
- Match state of the art optical and electrical performance
 - 85% transmittance, 50 Ω/sq
- Reduce cost by 50% to ~\$0.03/cm²
- Integrate with a current solar cell architecture
- Demonstrate repeatability and flexibility
- Demonstrate large area devices

Acknowledgments

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References

Nanowire, S., Hu, L., Kim, H. S., Lee, J., Peumans, P., & Cui, Y. (2010). Scalable Coating and Properties of transparent Ag nanowire. *ACS Nano*, 4(5), 2955–2963.