



## **SHIO: Printable high-efficiency solar cells with 70% CapEx reduction**

### **Background**

We will translate our newly-developed semiconductor ink science and associated printing techniques to develop printable and conformable interdigitated back contact (IBC) solar cells.

IBC cells are among the most complicated technologies, but they possess the highest power efficiency for mass production c-Si solar cell today. Our invention has the potential to significantly reduce the complexity and cost of manufacturing high-efficiency IBC cells by achieving precise deposition on-demand with printing techniques. Forecasted capex and module cost are 30-50% and 60-70% respectively, of the current IBC technology providing a low-cost approach for new IBC manufacturing. The technology will also allow utilization of ultra-thin and light substrates for conformable cells, custom shapes and sizes for drone, battery and multi-purposes products integration.

Preliminary work modified several semiconductor materials and successfully developing printable inks for silicon surfaces. When fully developed, SHIO will expand into module manufacturing. Conformable, high-efficiency and light IBC solar cells will provide crucial features for self-contained sensor, batteries and UAV devices.

### **Assistance needed**

Through the competition we will have two keys challenges that members of the American-Made Network could help with.

- Help in developing semiconducting ink chemistry and coating parameters.
- Access to inkjet and screen printing tools with alignment ability and 50um resolution.

Research scientists in NREL with a background in organic photovoltaics and solution processing would be great help for SHIO in developing printable solar cells. NREL also have advanced printing equipment. Assistance through the voucher program with associated fees for processing time and labor could be of great help.

Contact: Dr. Meixi Chen, [macychen@udel.edu](mailto:macychen@udel.edu)

Dr. Robert Opila, [opila@udel.edu](mailto:opila@udel.edu)