

Electroplating of Copper on Perovskites

Project Summary

Metallization constitute one of the major cost for photovoltaic modules. For perovskite solar cells, copper (Cu) has been identified by us to be one most promising metal electrode material. However it is generally deposited by thermal evaporation process, which limits the throughput of module fabrication, because other layers can be deposited by high-speed solution process. This project aims at developing an electroplating process to deposit copper so that vacuum process can be completely eliminated.

Innovation

We identified two main challenges in electroplating of copper on perovskites from our prior study: 1) the quick damage of perovskite by corrosive electroplating solution; 2) the insulating perovskites and charge transport layer limits the electroplating current. We propose strategies to address them by using tailored electroplating solution with selected copper salts and solvents. We will add a conducting silver nanowire layer on perovskites so that they do not limit the current.

Key figure

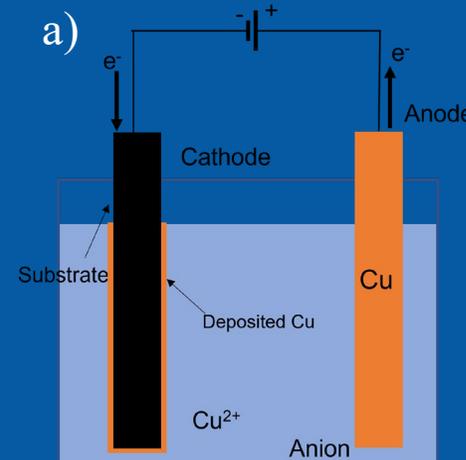


Figure 1 (a) demonstration of Cu electroplating. (b) Cu electroplated on top of Perovskite/ETL structure

Team and Milestones

Team leader: Haoyang Jiao, working on perovskites for 4 years
Team participant: Jinsong Huang, leading perovskite research in the last 8 years.

Key milestone:

1. Demonstrate the electroplating of copper on perovskites which has the same reflection and conductivity with evaporated copper;
2. Demonstrate comparable efficiency of perovskite solar cells using electroplated copper