

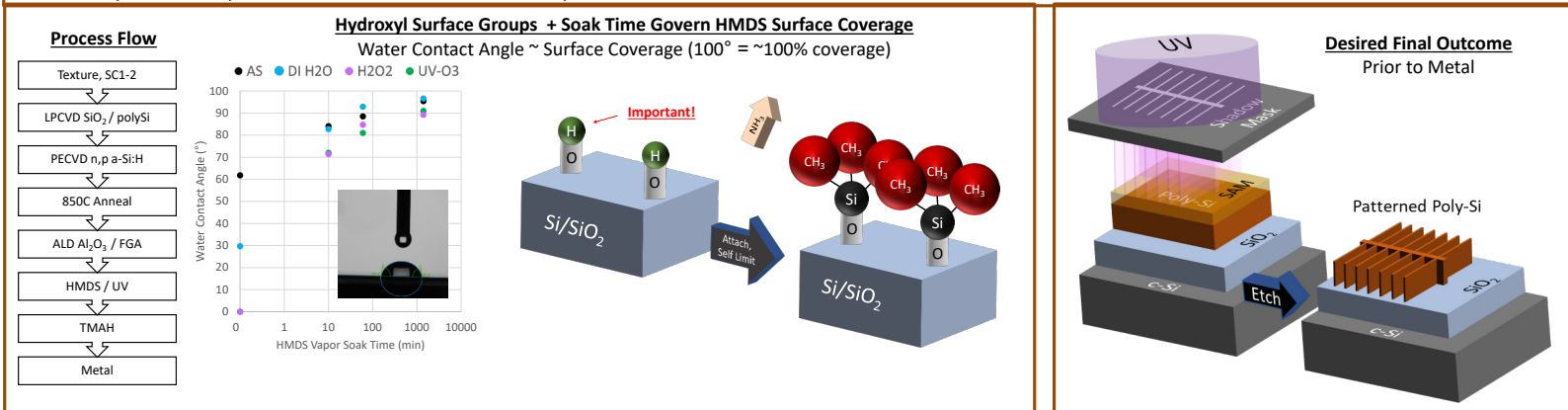
Self-Assembled Monolayer Procedure to Pattern Silicon Passivated Contacts

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Summary

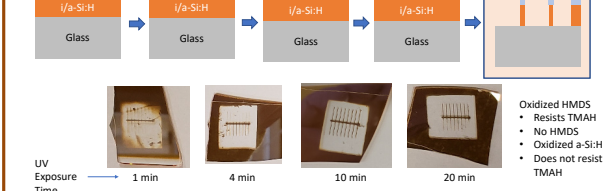
We utilize hexamethyldisilazane (HMDS)-based self-assembled monolayers (SAM) to pattern polysilicon (polySi) passivated contacts. We find process conditions that allow for etching frontside n/polySi between fingers; thereby increasing J_{sc} . Importantly, the V_{oc} does not degrade, indicating the additional process steps do not introduce defects or impurities.



Preliminary Experiments

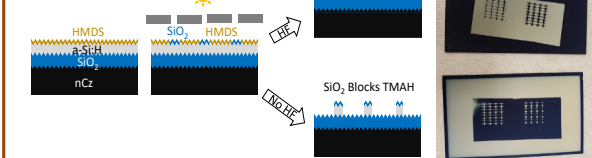
Patterning a-Si:H

UV Dependence

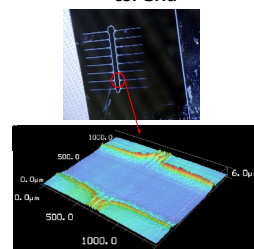


Patterning a-Si:H

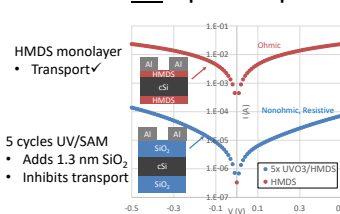
HF Dependence



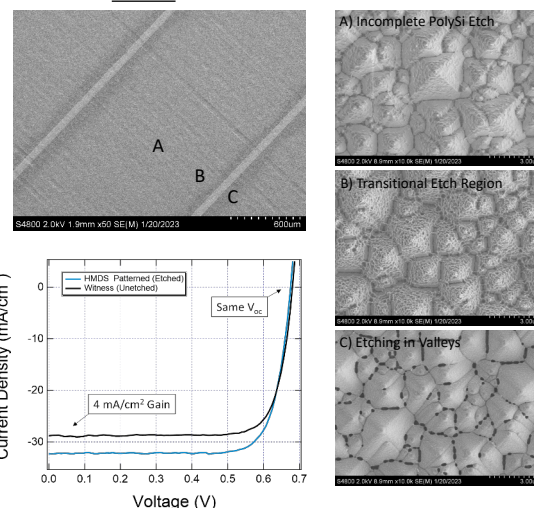
HMDS Patterned + TMAH Etched cSi Grid



SAM Does Not Impede Transport



Devices



Conclusions

- Pattern the frontside n/polySi in a front-back polySi passivated-contact solar cell using UV exposed hexamethyldisilazane (HMDS).
 - Remains on the surface for subsequent metallization.
- Experimental conditions such as etchant time and concentrations are identified and developed to increase the process window.
- Resulting cells show an increase in J_{sc} without significant V_{oc} degradation, with need to fully remove front n/polySi in future research.

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