First Long-Lived Perovskite Solar Cells Developed

Scientific Achievement
Scientists have developed the first perovskite solar cells that should maintain 80% of its efficiency for more than 5 years, opening the pathway to commercialization. It also has a comparable performance to silicon-based cells.

Significance and Impact
Perovskites are well suited for solar cell applications; however, until now their lifetime did not meet the industrial threshold. Additionally, this work establishes a new method for testing the durability and lifetime of solar cells.

Research Details
- Developed an accelerated aging test to understand the degradation routes of perovskite solar cells.
- Designed a 2D Cs$_2$PbI$_2$Cl$_2$ capping layer between the perovskite active layer and hole-transport layer that stabilizes the solar cell
- Used x-ray scattering tools at the CMS beamline at NSLS-II, operated in partnership with CFN, to confirm the properties of the capping layer.

Illustration of the capped device structure employed in this work.


This work was performed at the Center for Functional Nanomaterials and National Synchrotron Light Source II.