DuraMAT Capabilities

1. Data Management & Analytics, DuraMAT Data Hub
2. Predictive Simulation
3. Advanced Characterization & Forensics
4. Module Testing
5. Field Deployment
6. Techno-Economic Analysis

This project

Determination of BACKsheet material properties: a comparison of market-benchmark technologies to novel non-Fluoro-based co-extruded backsheet materials and their correlation and ImpACT on PV module degradation rates

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Industry Goals

• Study a variety of co-extruded, fluorine-free backsheet materials, and compared to benchmark market backsheets, as-is, artificially-aged, and when-utilized in a PV module
• Evaluate the relative rate of degradation of commercial and experimental backsheets.
• Derive parametrized equation that describes degradation rates of backsheets to predict useful life from lab data.

Expected Outcome and Impact

• Parametrized equation predicting the service life of backsheets, and validated by both lab and outdoor extensive testing.
• Technical and commercial confidence to the entire value chain: from backsheet and module manufacturers to the downstream community (IPP, banks, developers) that materials of higher quality can help reduce finance costs, therefore driving down LCOE.
• A fast track PV module market adaptation for novel high-quality materials, such as co-extruded polyolefin-core backsheets, by obtaining unbiased durability data.

Project Outline

Commercial / Benchmark Backsheets:
(TPT, KPf, PPF, AAA)

R&D / Coextruded / Fluoro-free Backsheets:
(PA-PP, specialty polyester -PP, all polyolefinic)

Initial Characterization

BS Unlaminated

BS Laminated

Baseline SASX completed on all seven backsheets
Clear differences between laminated and unlaminated samples suggest microstructural changes happen during lamination
Preliminary WAXS data also completed (not shown)

Test Characterization Analysis

Correlations

Parameterized equations defining degradation rates of backsheets to predict useful life from lab data

Timeline

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Small Angle X-ray Scattering (SAXS)

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