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UV-Thermal Combined Stress Acceleration Test

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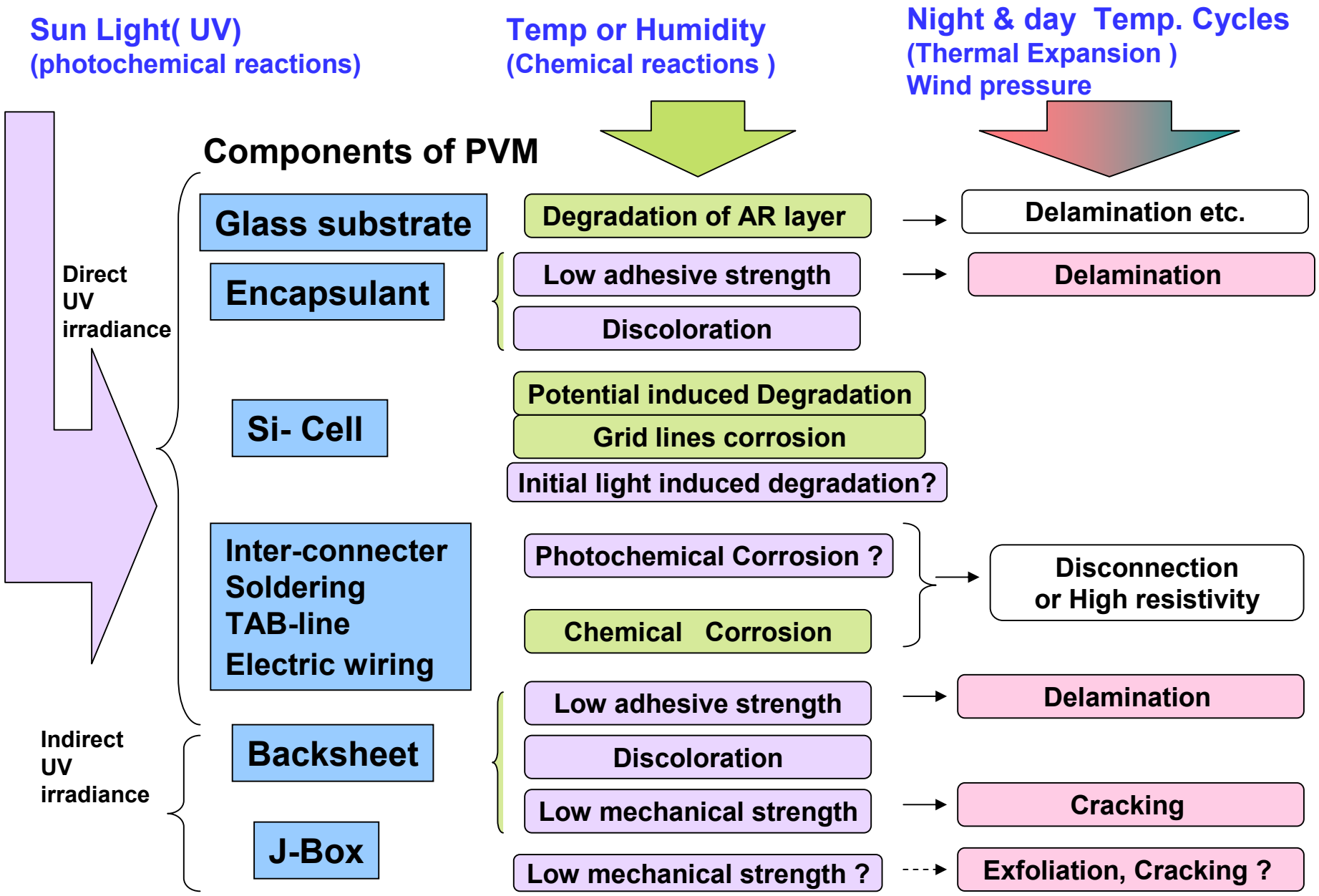
Degradation and Defect by Stress Factor



Key point which should be taken into consideration on UV acceleration test of PV module

1. Photochemical reactions of polymer material

Amount of decomposition product & reaction products which depend on

Temperature ,
Water (Humidity) ,
Acid , Metal ions as Catalyst (created by Hydrolysis or Corrosion)
UV light spectrum

⇨ **At least 2 levels test condition (temperature and humidity)**

2. Invisible or undetectable degradation of Materials in UV test or DH test of PV modules

e.g.)

- Weak Adhesive-strength of EVA Encapsulant or Backsheet
- Weak Mechanical-strength of Backsheet

In actual installation environment, defects, such as delamination of EVA and a crack of Backsheet, occur by exposing a module to the **mechanical stress** by day-night temperature cycle or wind pressure.

⇨ **HF (TC) or the dynamic mechanical test following UV test sequentially**

UV-Thermal, Humidity Combined Test

1st step
(materials degradation)

Test 1: UV with High Temp.
For High temperature, an arid region

e.g. (to be discussed in TG5)
3or 5 SUN at 70 to 85deg C (DRY?)
2000 hours or more
Light source: Xenon Lamp or other ?

Test 2: UV with High Temp & Humidity
High humidity and/or tropical region

e.g. (to be discussed in TG5)
3or 5 SUN at 85deg C , 85%RH
2000 hours or more

or
3or 5 SUN at 70 or 85deg. C
2000 hours or more
+ Sequential DHT (85deg.c 85%RH)
2000 hours ? or more

2nd step
(Occurrence of defects)

HF 10cycles
(or TC 100 cycles)

or

Dynamic Mechanical Load test

Note :For Backside of module, 15% of front-side irradiance UV test will be required