

Motivation for designing new PV materials



- Decrease of LCOE: Cost reduction and performance improvement
 - *Reduction and replacement of expensive materials*
 - *Acceleration of manufacturing process*
 - *Performance increase*
 - *Production related cost decrease*
- Sustainability and legal regulations
 - *Ecodesign*
 - *Recyclability*
 - *Replacement of rare or harmful materials*
- New technological requirements
 - *Wafer technology*
 - *New cell and interconnection technologies*
 - *New module designs*



Figure 19: SmartWire Connection Technology (SWCT™).

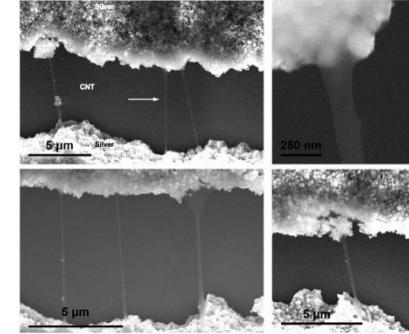


Figure 24: BRIDGECONCEPT – experimental observation of carbon nanotubes bridging cracks

	#	Material	Cost
ETFE (Positive control)	1	ETFE (Monolithic)	High
Non-PET options	14	PVDF (Monolithic)	High-Med
	15	PC + Acrylic-coating 4	High-Med
PET w/ UV filtering layer	3	PET + Fluorinated layer	Medium
	13	PET + Fluorinated coating 2	Medium
PET w/ UV filtering coating	4	PET + Acrylic-coating 3	Med-Low
	9	PET + Acrylic-coating 1	Med-Low
	11	PET + Acrylic-coating 2	Med-Low
	12	PET + Fluorinated coating 1	Med-Low
PET w/ integrated UV absorbers	6	PET + UV blocker 1 (high)	Med-Low
	8	PET + UV blocker 2 (high)	Med-Low
	5	PET + UV blocker 1 (low)	Low
	7	PET + UV blocker 2 (low)	Low
Non-stabilized PET (Negative control)	2	PET + w/o UV blocker 1	Lowest
	10	PET w/o Acrylic-coating 1	Lowest

Figure 6: Candidates for polymeric frontsheet materials

Challenges for new materials and components



- Check of compatibility of PV module components will get more and more important in the future, as the variety on materials and components will grow



Adhesion - delamination:

- Adhesion to glass and solar cell strongly dependent of lamination parameters
- Surface treatment of backsheets usually optimized for adhesion to EVA but not alternative encapsulants



Backsheet yellowing: Migration of additives into backsheet -encapsulant interface are main cause for backsheet yellowing



Corrosion: Broad variety of new ribbon materials, interconnection technologies and encapsulant films