Modern Circular Economy – it is not a dream
Photovoltaic waste
фотоэлектрических отходов

Si  Al  Ag  (In)  Sn  Pb  Cu  glass  plastic
estimated cumulative global waste volumes of end-of-life PV modules, by IRENA/Task12
What are the real challenges? … the structure
What are the real challenges? … strong adhesion between the layers

- front glass
- encapsulation material (plastic foil)
- silver/Si/aluminium
- encapsulation material (plastic foil) TEDLAR

LuxChemtech GmbH
Freiberg, Germany
after treatment

encapsulation material (plastic foil) TEDLAR

+ 

encapsulation material (plastic foil) silver/c-Si/aluminium

LuxChemtech GmbH Freiberg, Germany
How to solve the problems?

With a special water jet technology we could separate the layers:

encapsulation material (plastic foil) TEDLAR

encapsulation material (plastic foil) Silver / Si / aluminium

front glass
How to solve the problems?

With a special water jet technology we could separate the layers:

1. Front glass
2. Encapsulation material (plastic foil) TEDLAR
3. Silver / Si / aluminium
4. Cover layer
How to solve the problems?

With a special water jet technology we could separate the layers:

- Encapsulation material (plastic foil): TEDLAR
- Encapsulation material (plastic foil): Silver / Si / aluminium
- Front glass
encapsulation material (plastic foil)
silver/c-Si/aluminium

- not corrosive, easy to handle
- biodegradable
- No toxic gases!

LuxChemtech GmbH
Freiberg, Germany
Our products from Si-PV recycling

- silicon grains
- silver chloride
- poly-aluminium-chloride
  (for water treatment)
Our products from PV recycling

- pure white glass as secondary raw material
- mixed bus bars
- Tedlar
- EVA plastic

LuxChemtech GmbH
Freiberg, Germany
Silicon from scrap for new photovoltaic application? YES!

- Production of multicrystalline Si-ingots up to 960 kg (G5, G6)
- Capacity: 25 ingots/month
  - silicon sputtering targets
  - photovoltaic applications
  - material qualifications
  - purification
  - dopant alloys (n-type, p-type)

LuxChemtech GmbH
Freiberg, Germany
Thin films and laminated products …

State of the art: shreddering

Disadvantage: mixing of all
Our Technology is Transferable

Example: TFT LCD

- Open the composite by using the experience of PV treatment
- Isolation of fuoro-organo compounds (liquid crystals) (12) and spacer (8)
- Recovering of ITO (7)
Rare Earths Elements scrap used as raw material.

organosulphur compounds as chemical transport systems for Rare Earths

e.g., example for lanthanum:

La-OSO₂R \rightarrow H₂O₂ \rightarrow H-OSO₂R \rightarrow H₂(C₂O₄) \rightarrow La₂(C₂O₄)₃ \rightarrow La

LaB₆

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- Greening the Solar Industry with PV-Recycling
- Certified waste management company
- Proven history of successful waste management solutions in Germany for the solar industry
- Sustainable recycling

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