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Efficient method for separation and valorization of materials from End of Life PV panel



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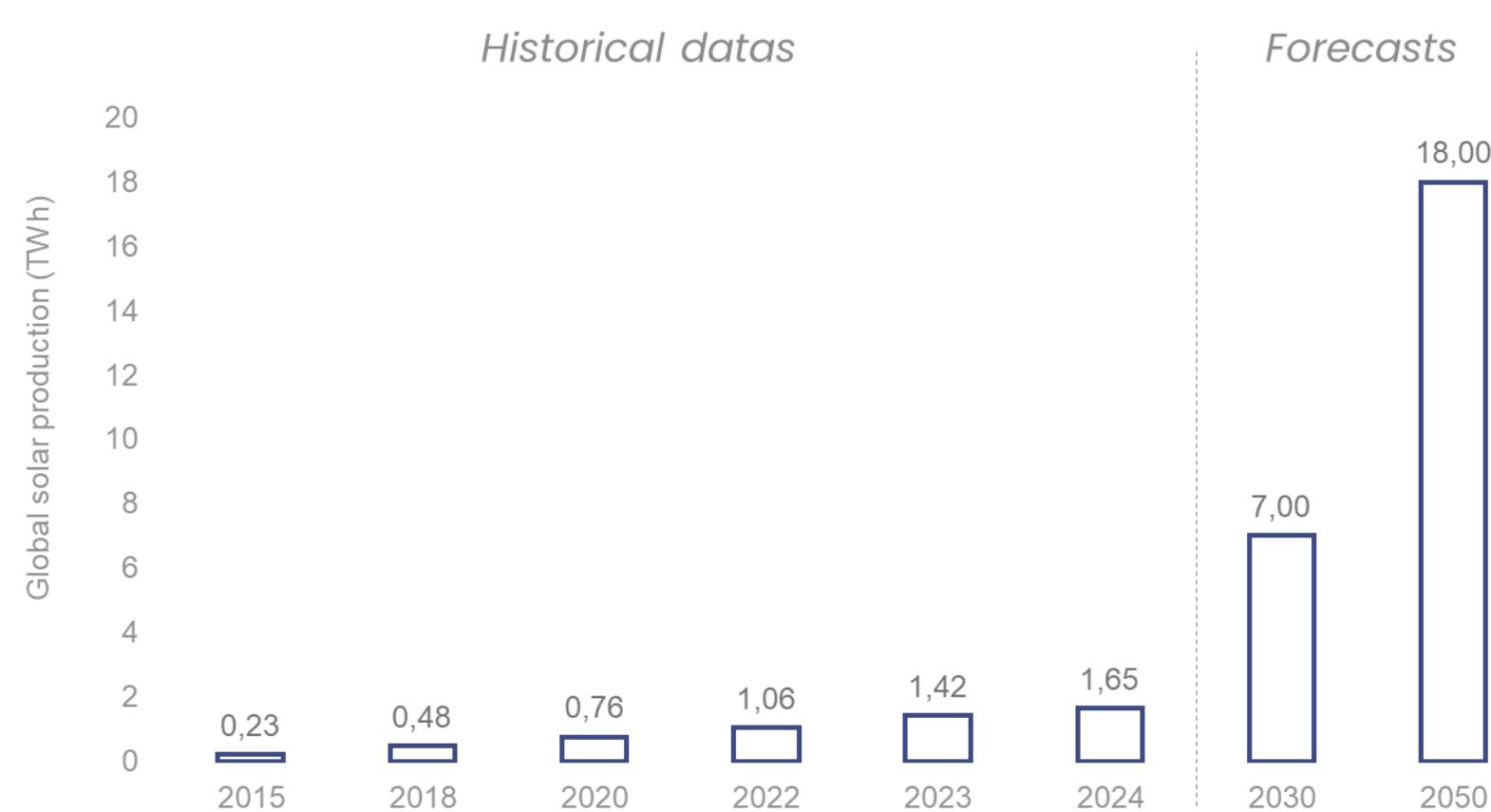
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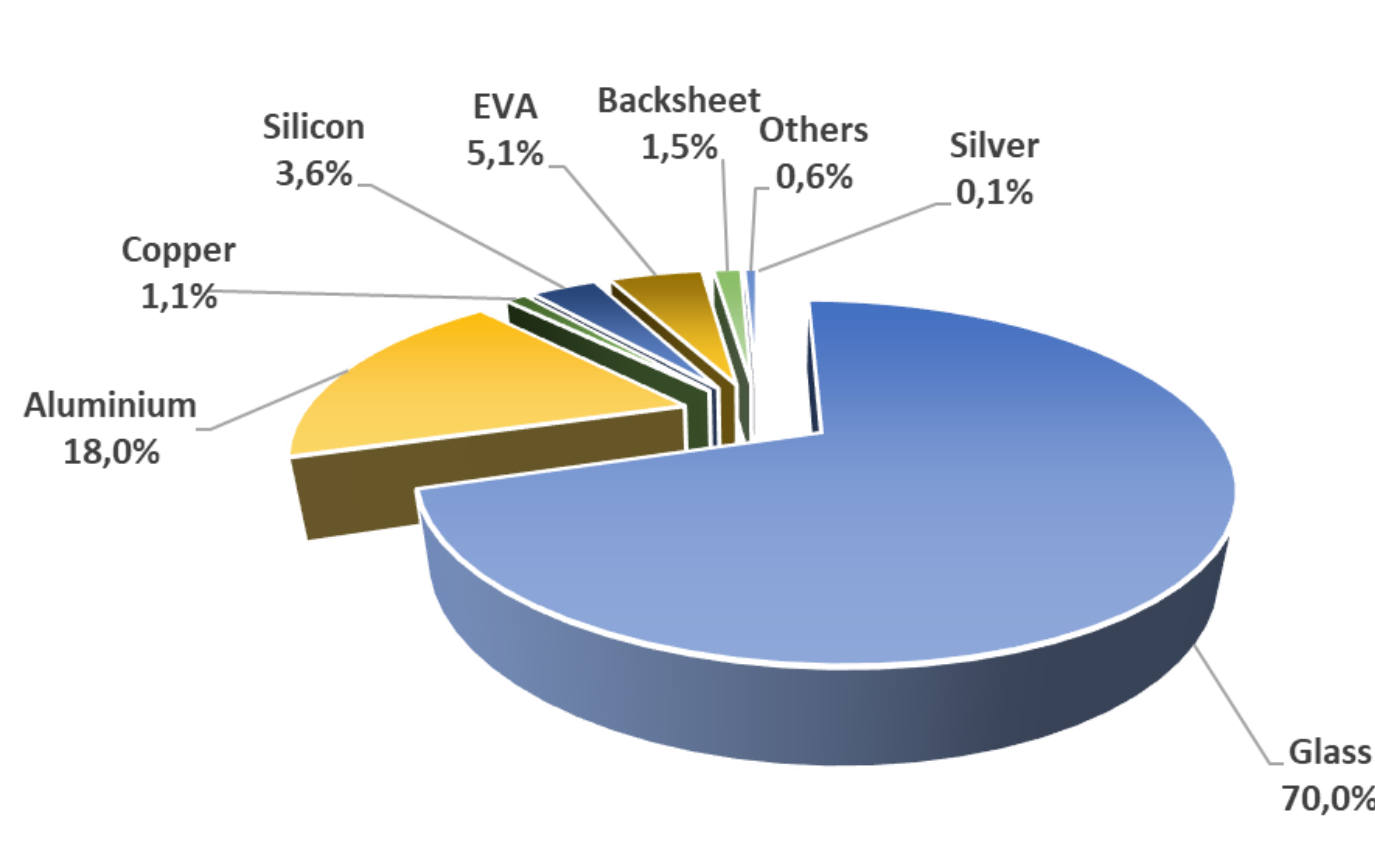
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Context

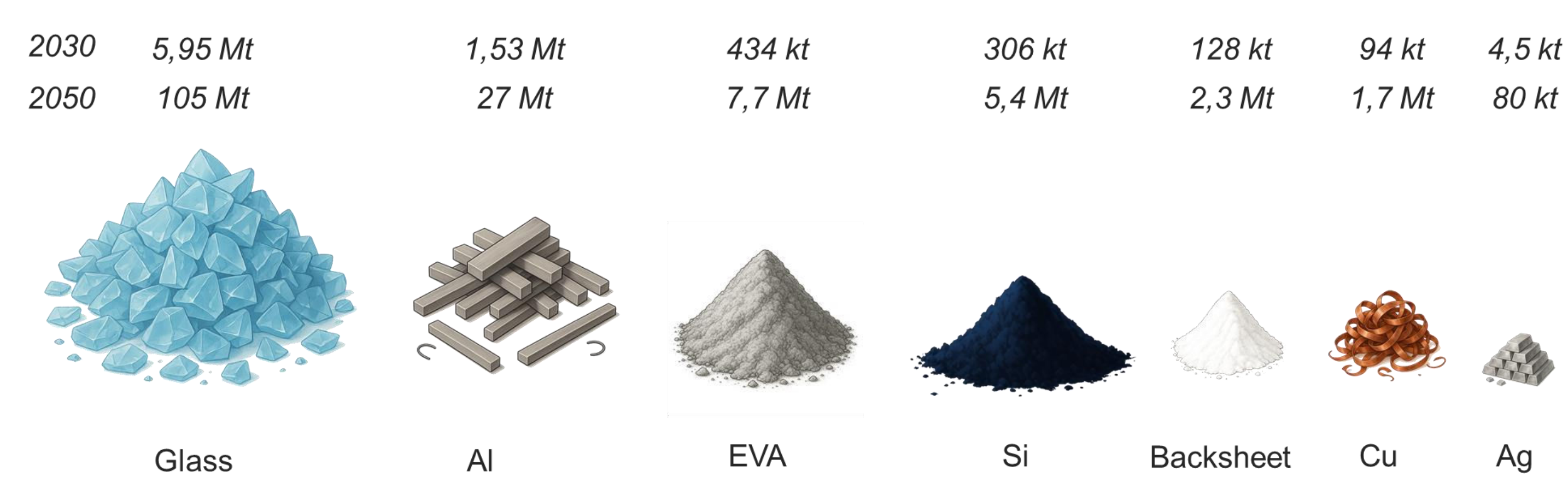
Global solar production



Standard PV panel composition

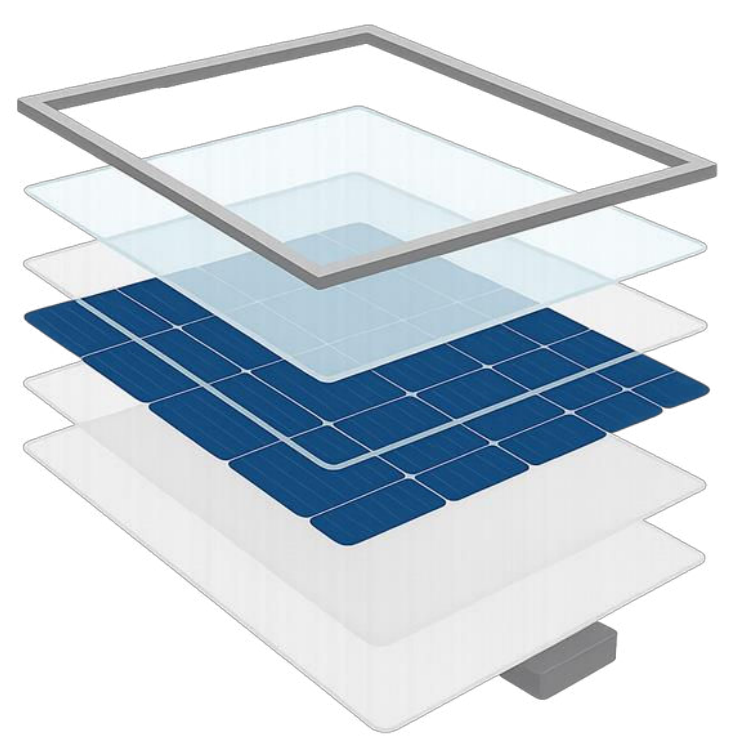


Valorizable PV wastes forecasts for 2030 and 2050

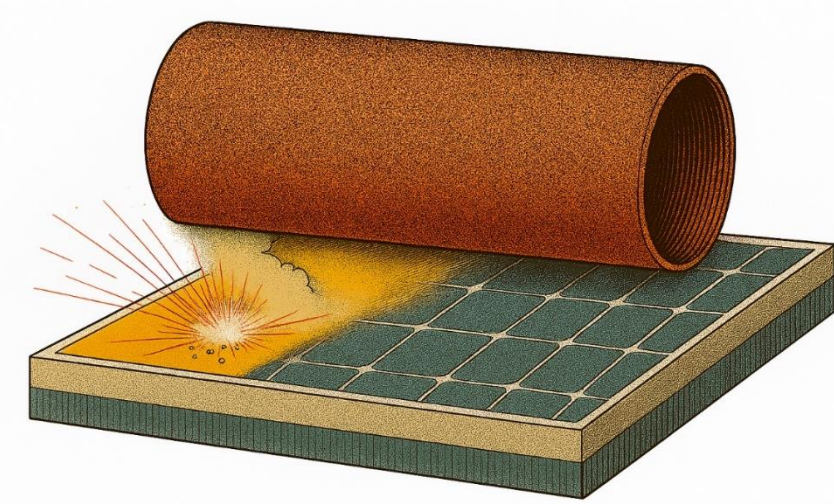


Delamination: access to valorizable materials

Solar panel



Grinding Delamination

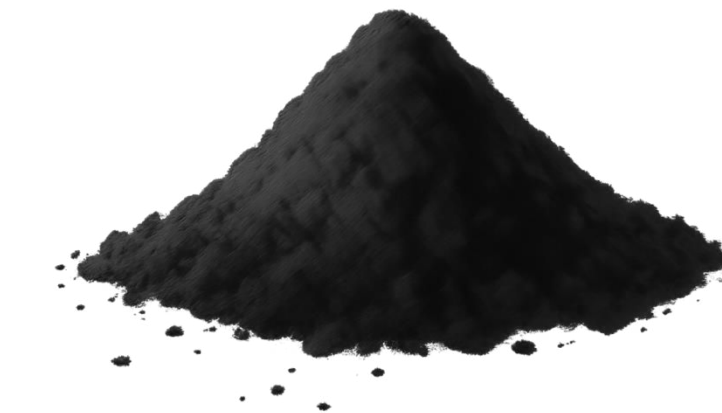


Presentation 5D0.18

Glass panel



EVA + cells mixture

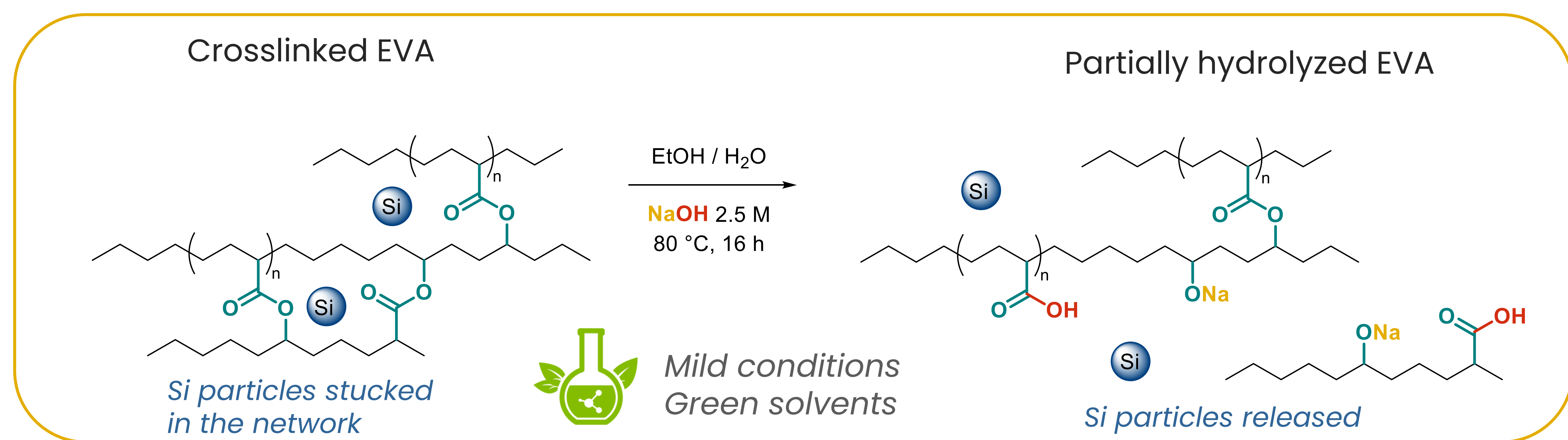
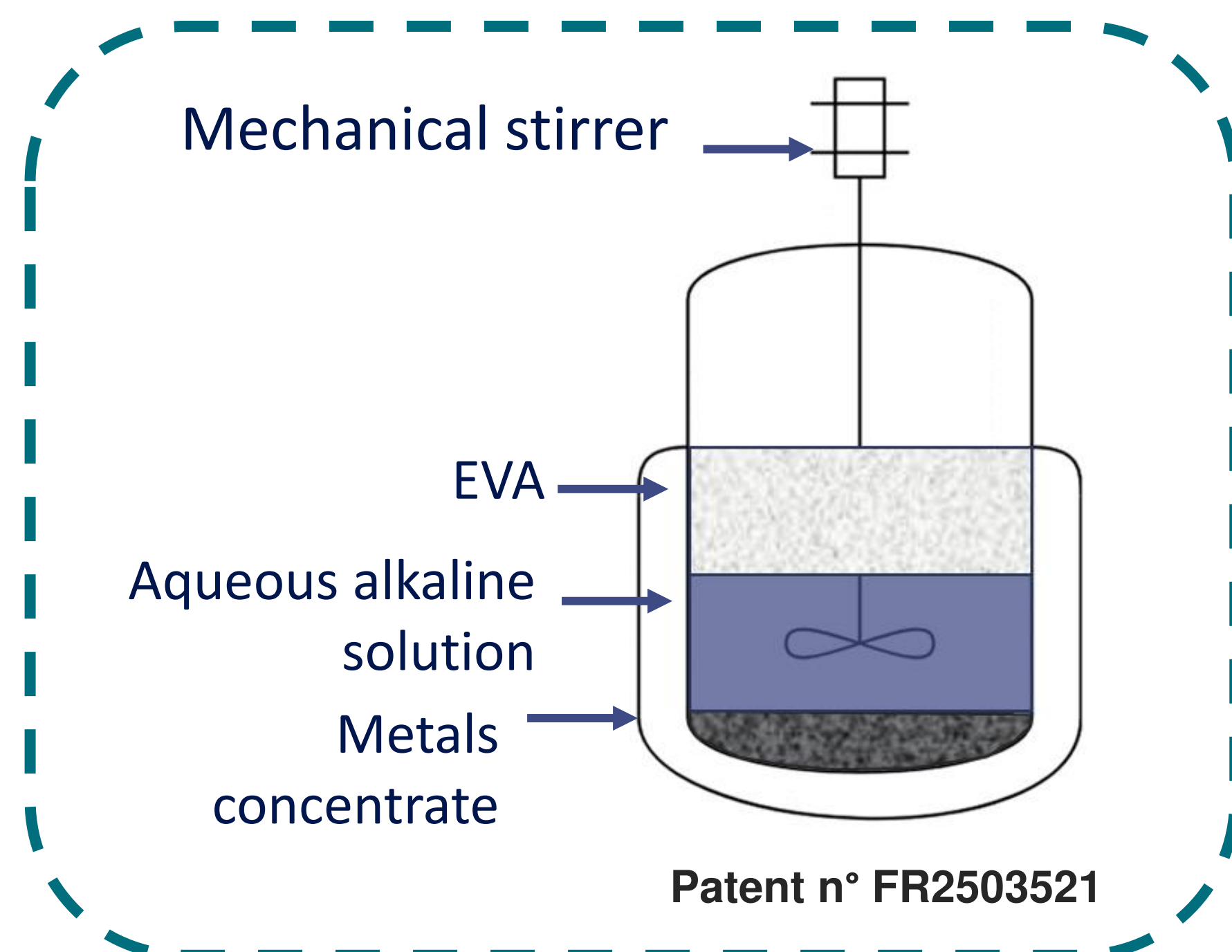


Backsheet powder



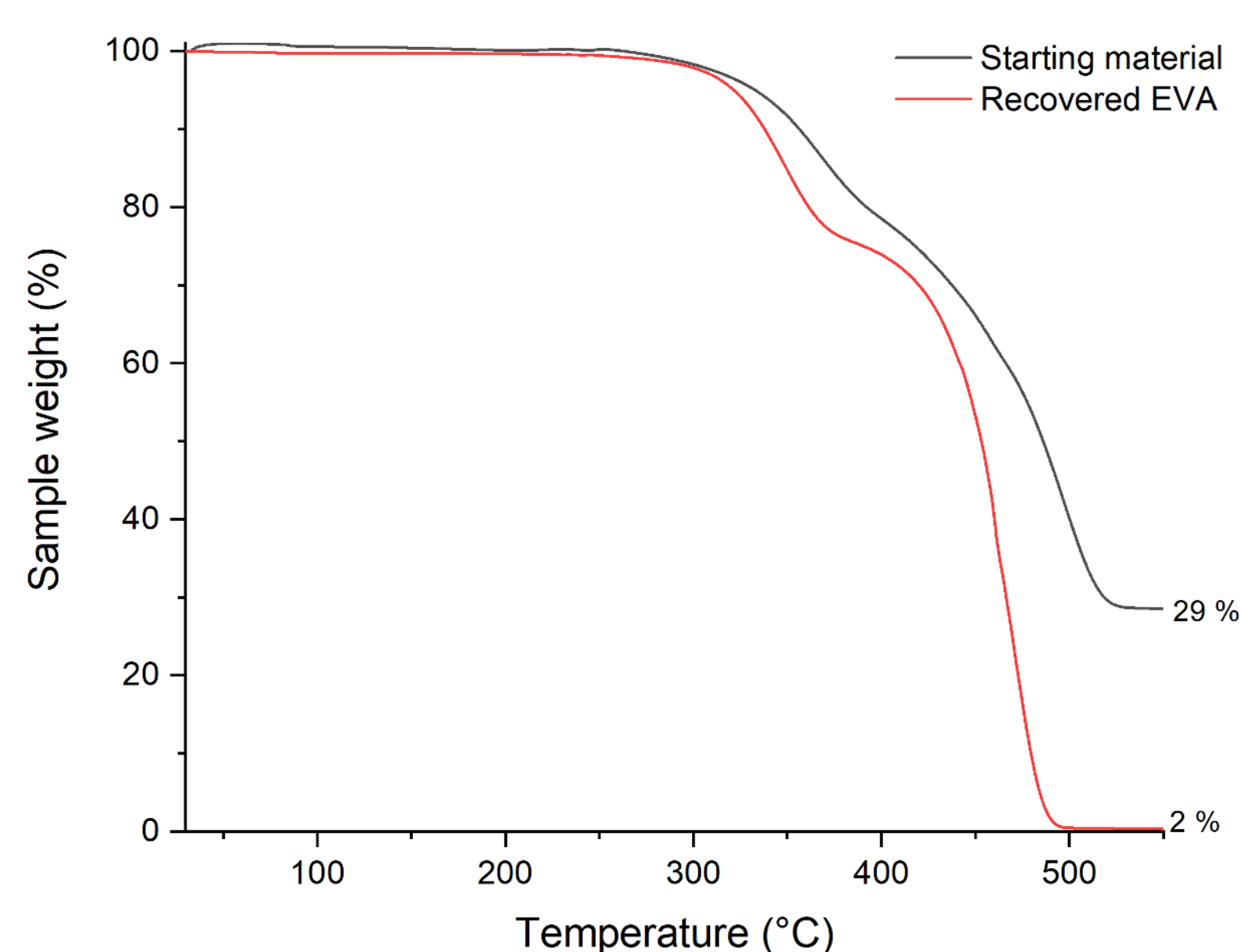
- Layer by layer grinding delamination
- Sieving of recovered powder (300 μm)
- Mix of EVA and cells (71 % wt. polymers, 29 % wt. metals)

Materials concentration: Chemical process

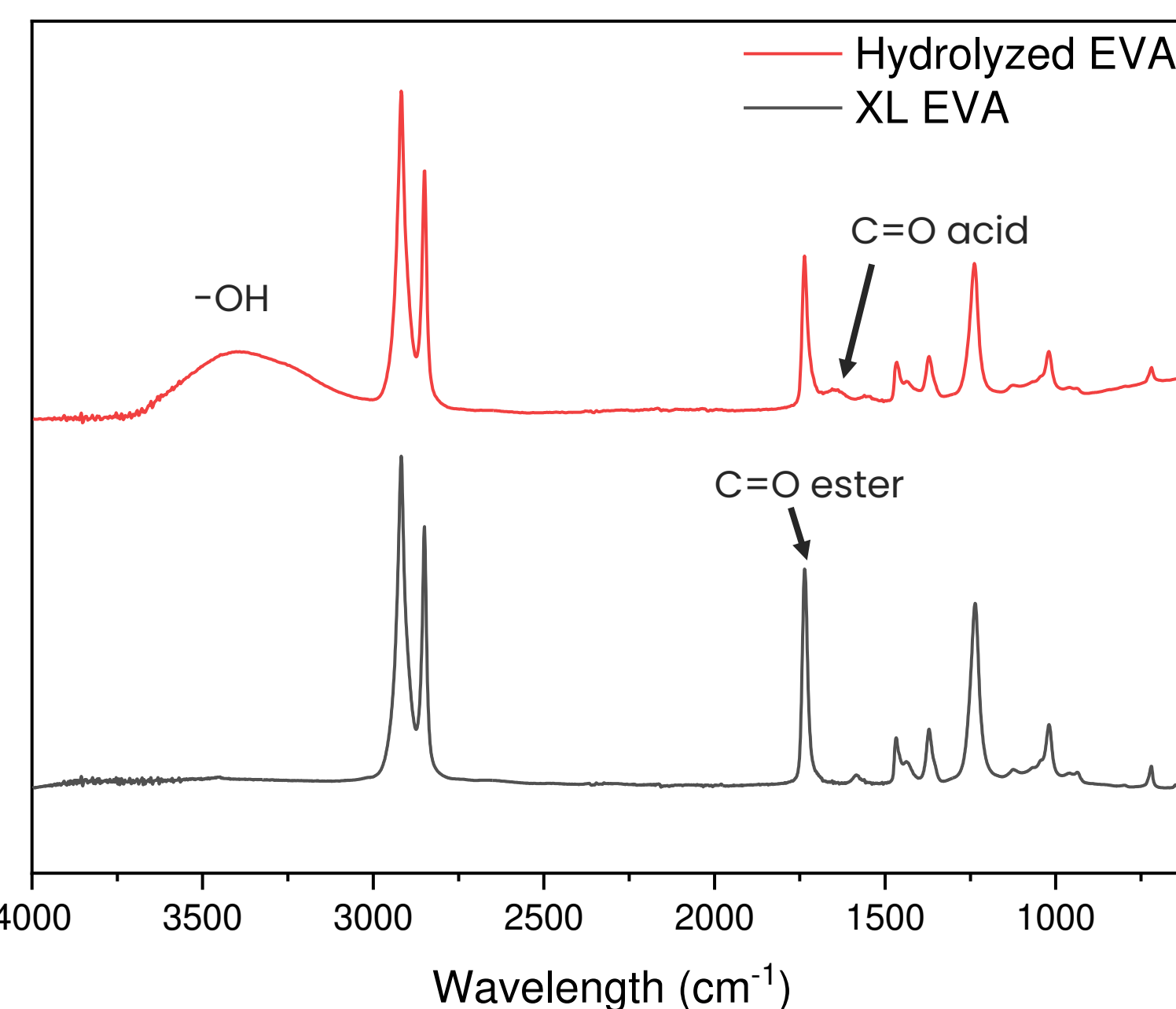


Materials characterization

TGA of strating material (powder mixture) and recovered EVA

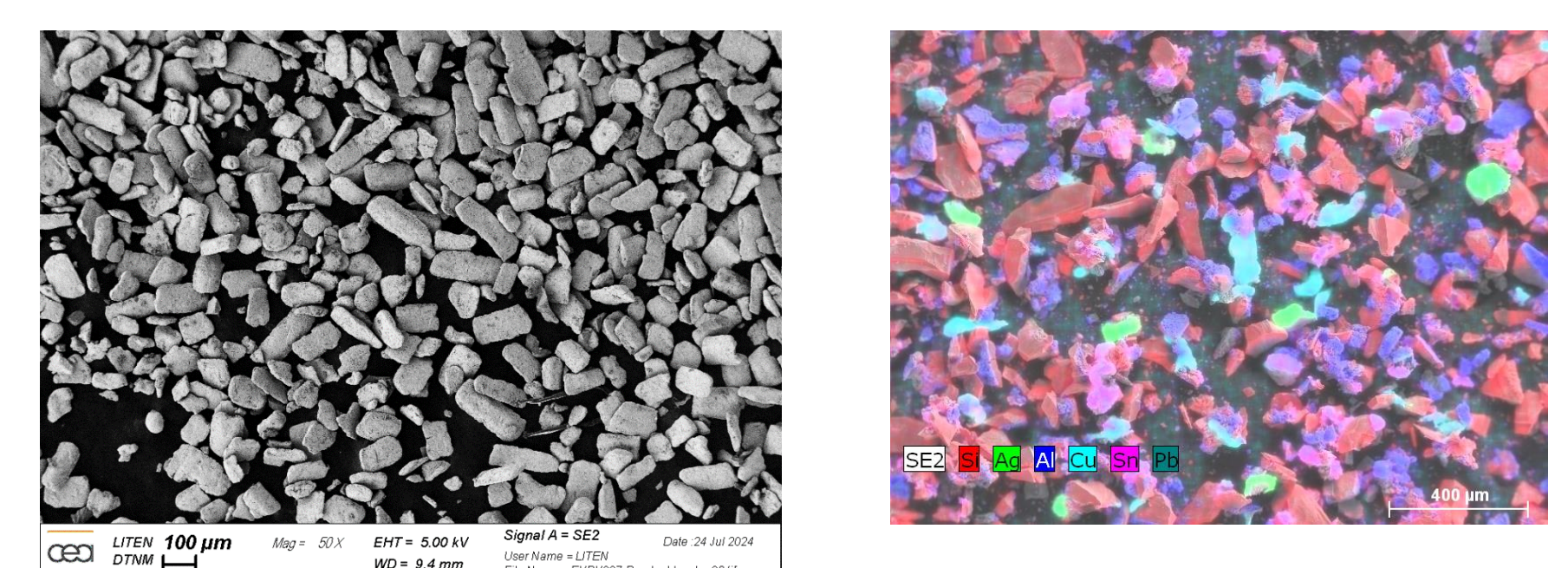


FTIR spectra of crosslinked EVA and hydrolyzed EVA



- **Alkaline treatment:** partial hydrolysis of encapsulant / silicon etching
- **Densimetric separation** polymers/metals
- Silicon particles release
- Recovery of **63 % of EVA with a purity of 98 %**

SEM image and EDS mapping of metals concentrate



Perspectives

- Use recycled EVA as a charge in new encapsulant manufacturing
- Manufacturing minimodules with recycled EVA

Bibliography

- Energies **2022**, 15, 5113. <https://doi.org/10.3390/en15145113>
- <https://www.irena.org/>
- Patents n° 2503519/FR2503521