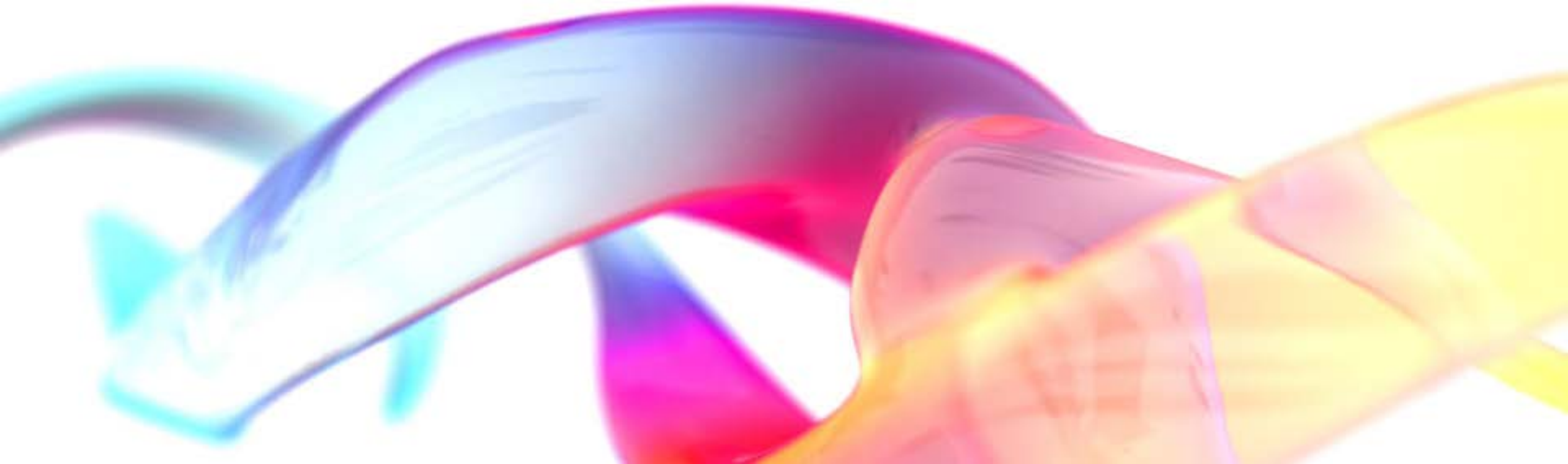


Fractional Crystallization by Sulzer Chemtech

SOCMA, March 1st, 2023

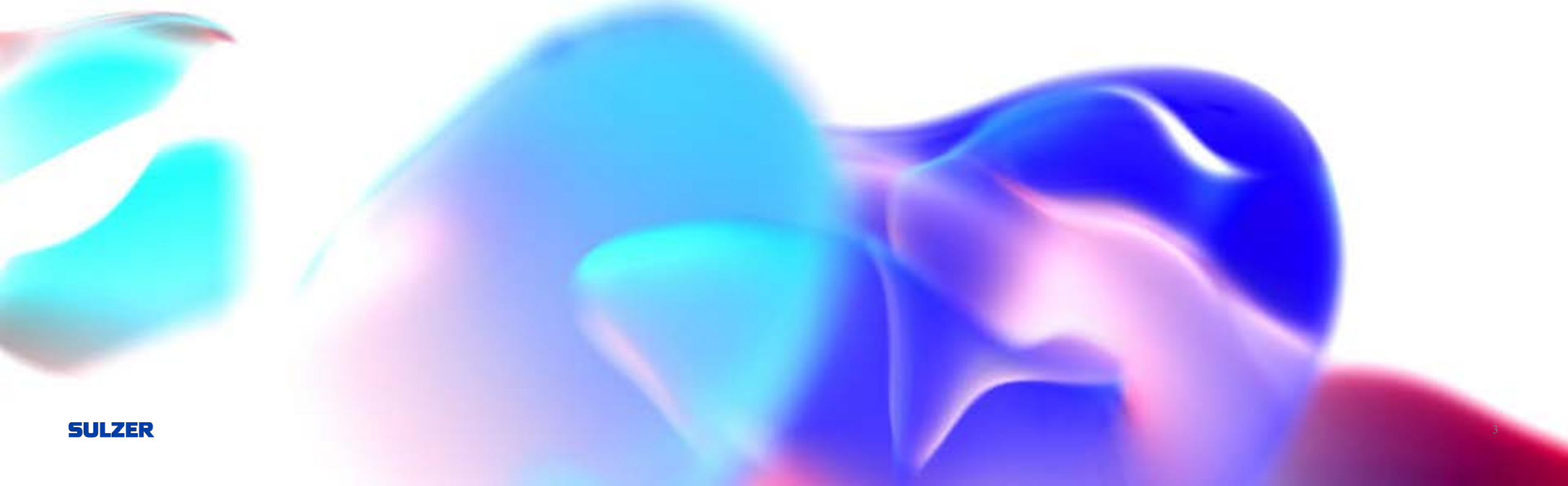
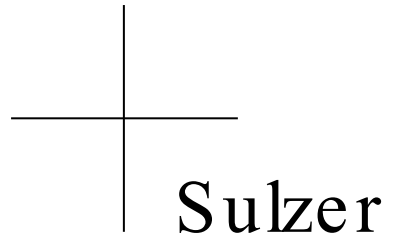




Agenda



- Sulzer
- Applications
- Crystallization 101
- Looking at the world future





Sulzer: global leader in fluid engineering

We combine reach with responsiveness

3.2

Billion sales
(CHF) 2021

13'800

Employees

40

Production
locations

140

Service centers

100

Countries with
Sulzer presence

We supply mass transfer equipment and technologies to the industry



Chemtech

We make chemistry happen

Separation Technology



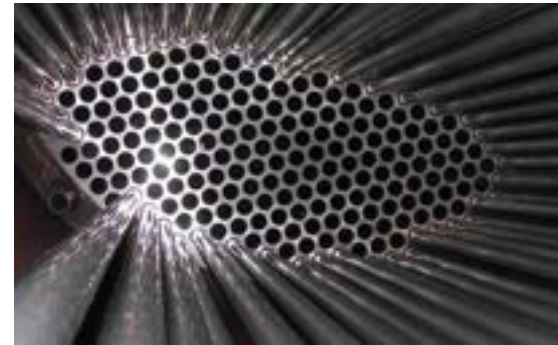
Mass transfer equipment with solutions for all types of separation, from distillation and absorption to phase separation, liquid-liquid extraction.

Tower Field Services



Installation and upgrade services for key equipment such as separation units, mass transfer components and automated weld overlay waste to energy boilers for the refining, chemical processing and power industries.

Polymer and Fractional crystallization



Innovative technologies for crystallization and high-quality chemicals and polymers – market leader with its unique ring opening polymerization technology for polylactic acid (PLA).

Clean Fuel and Chemical Licensing



Global licensor for process technologies and mass transfer solutions for the refining, chemical, petrochemical and gas processing industries to optimize efficiency and capacity, reduce costs and minimize environmental impact.



Many crystallizers at work today

... industrial solutions



50+ years of expertise


300+ products tested in our lab

80+ melt crystallization plants
commissioned worldwide over the past
20 years for monomers, fine chemicals,
food and other applications



Sulzer applications for crystallization

Petrochemicals

- Acrylic acid 
- Ethylene carbonate
- MDI
- TDI

Agro & fine chemicals

- Organic peroxides

Coal tar chemicals


Heat sensitive


Food

- Phytosterol
- Fatty acids

Inorganics & specials

- Hydrogen peroxide
- Hydrazine

- BPA
- Caprolactam 

- Lactides 

- DMT 
- Acetic acid 
- MMA 
- Styrene 
- Waxes & Paraffin 
- Xylenes  

- Benzoic acid
- Benzyl benzoate
- Halogenated aromatics
- MCA
- OPP
- PPD

- Naphthalene
- Anthracene
- Carbazole
- Fluorene

Close boilers

- Phosphoric acid
- Potassium hydroxide

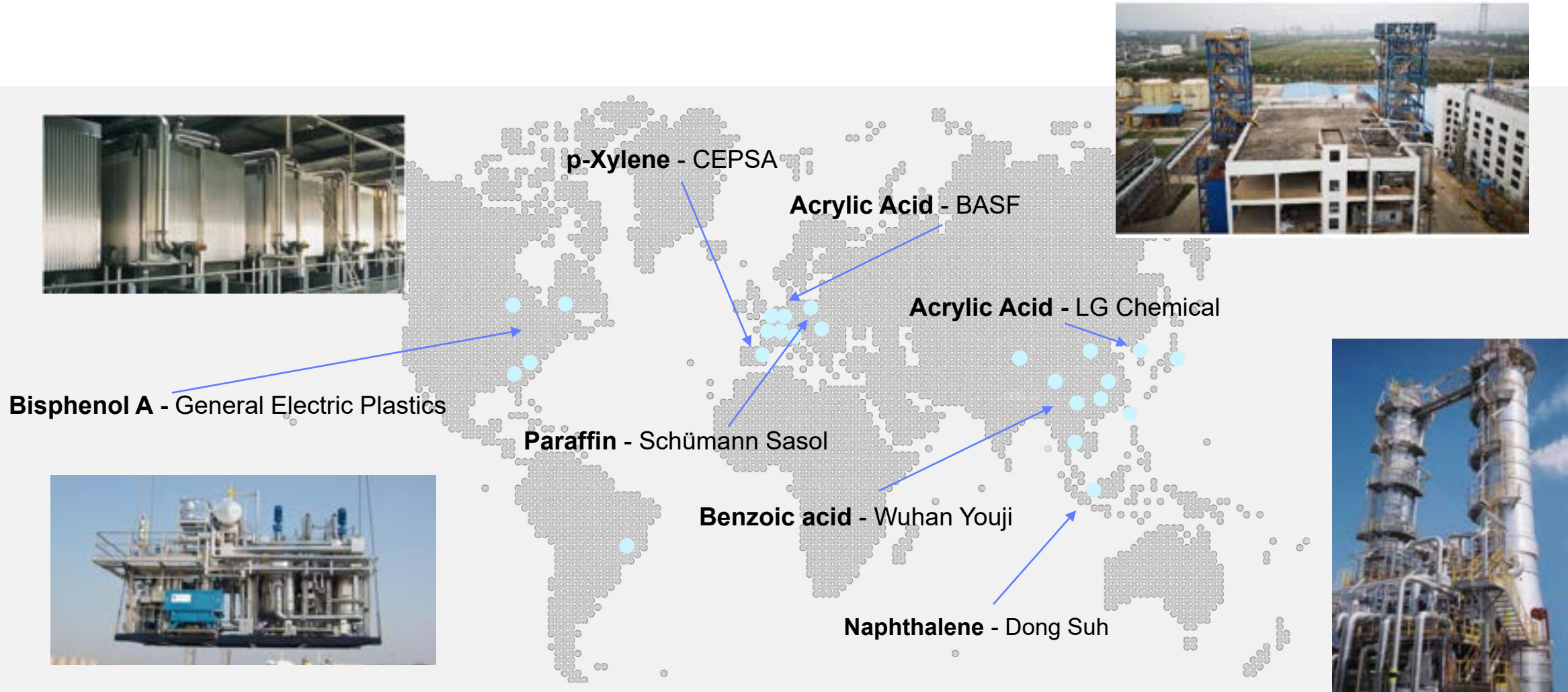
- Coffee
- Juice
- Beer

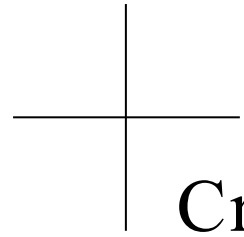
- Wastewater

Freeze concentration



Selected references





Crystallization 101

Melt crystallization basis - theory and application

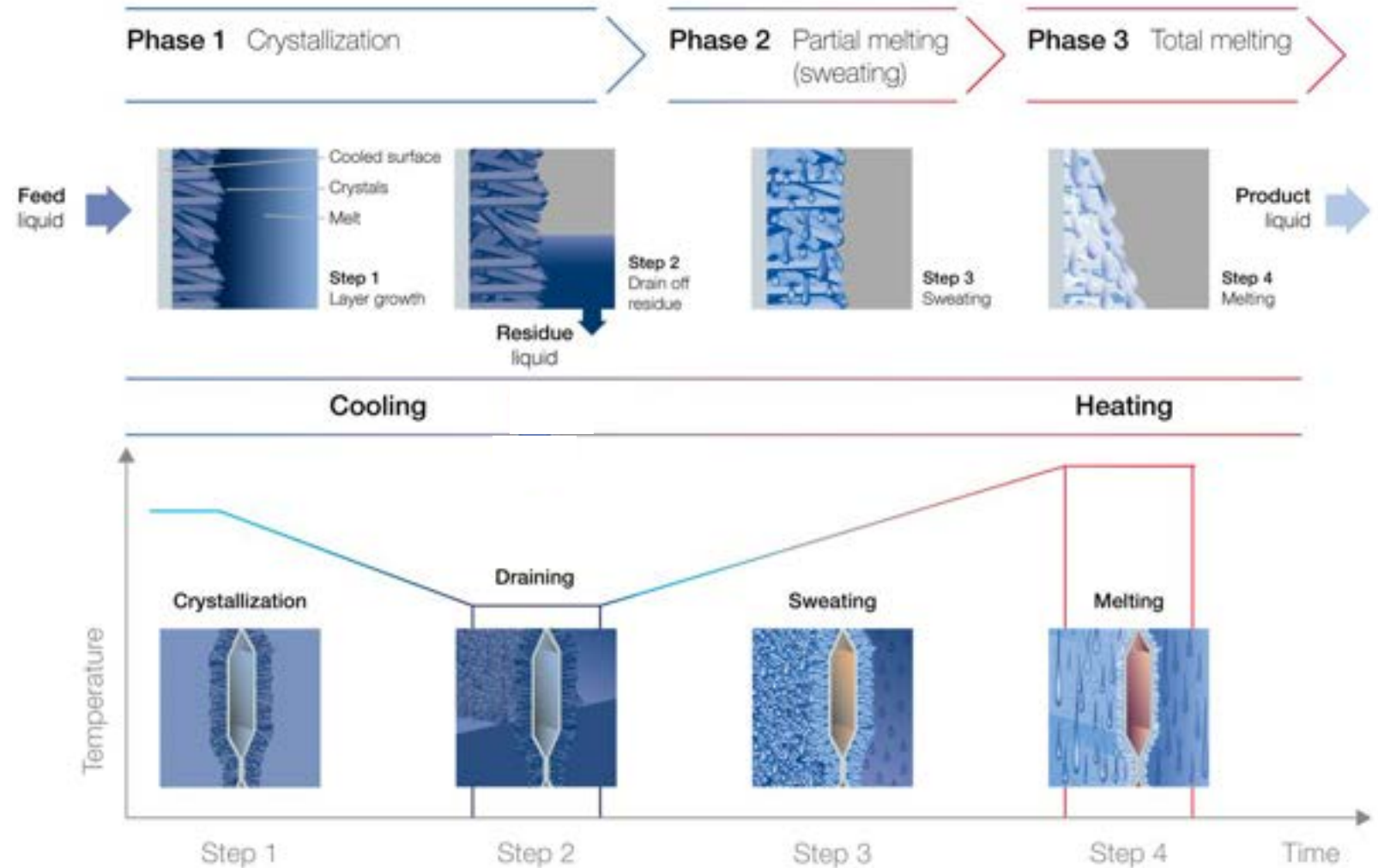


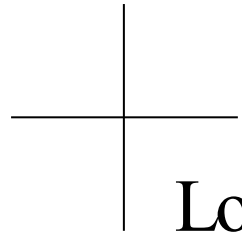
Crystallization 101

Fractional melt crystallization technologies:

- Falling Film
- Static
- Suspension

Layer





Looking at the world future

Our role together with you



A glance to the future

Plastic recycling and electrification





A glance to the future

Plastic recycling and electrification

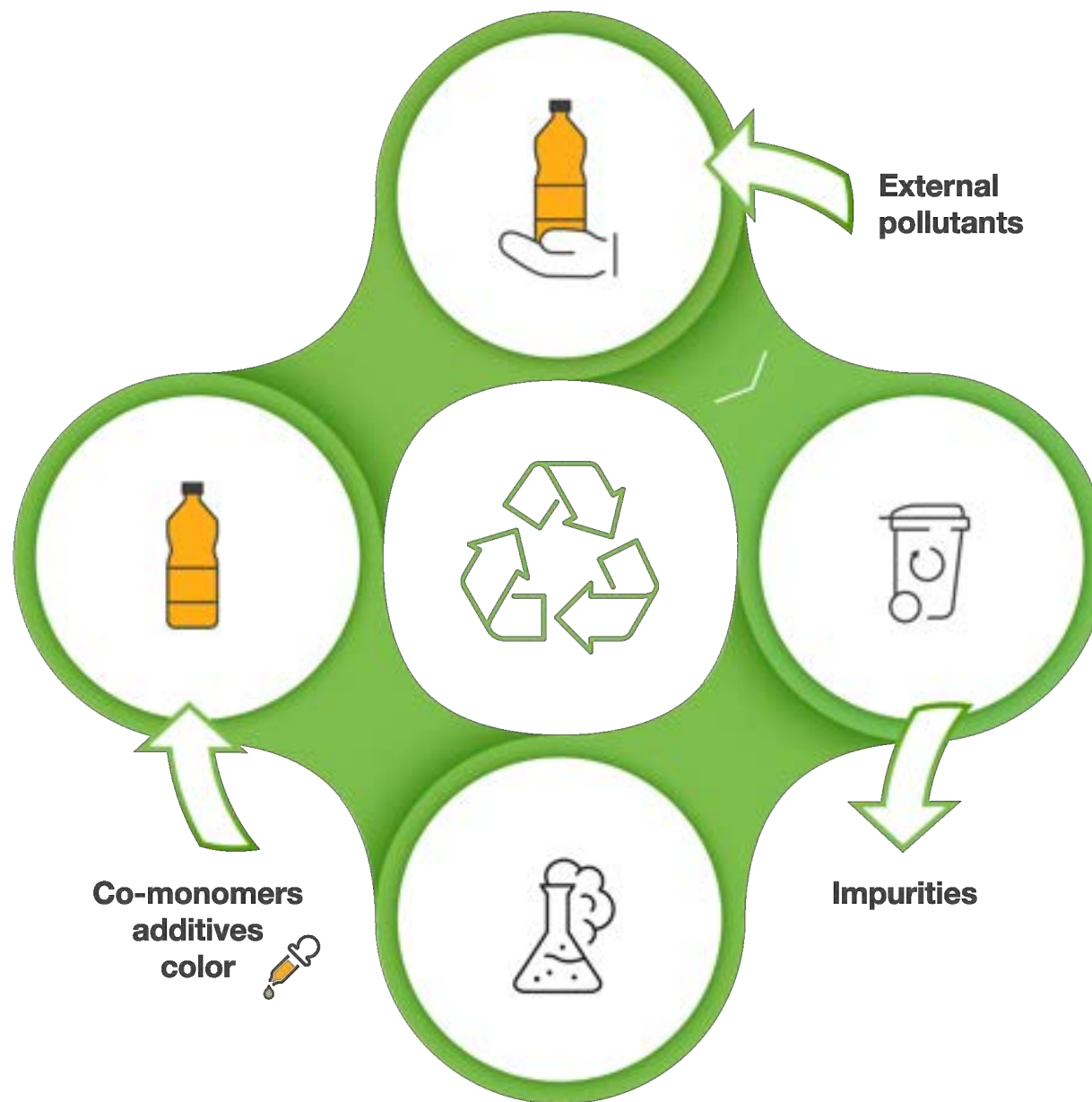




Plastic recycling

Distillation purification

- Crude product from post consumer recycling comes with a much more challenging impurities mix
- Distillation is a cost-effective solution to remove most of the impurities





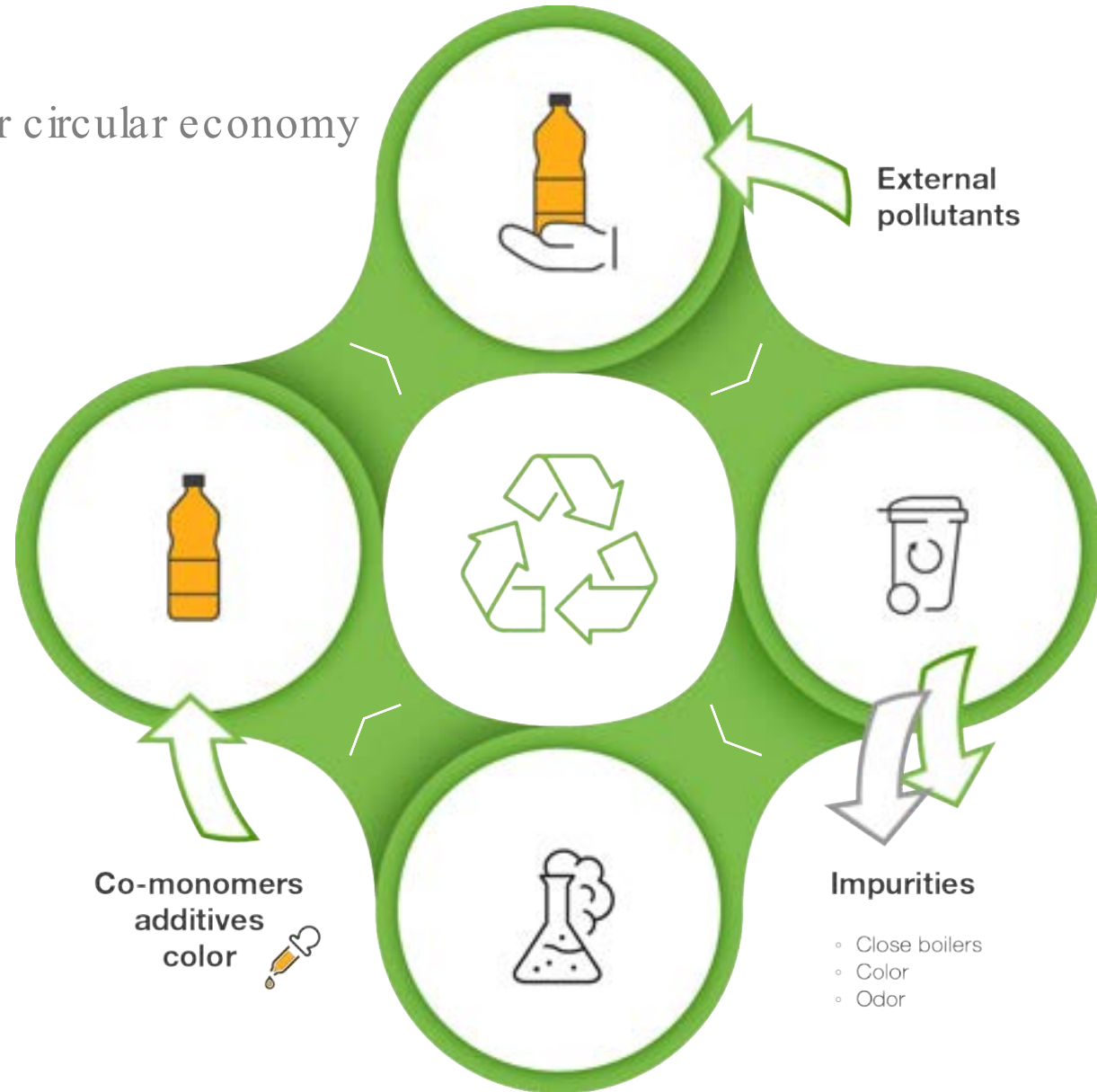
Plastic recycling: a new life

Fractional crystallization plays a key role for circular economy

- Crystallization ensures trully virgin like quality for recycled product



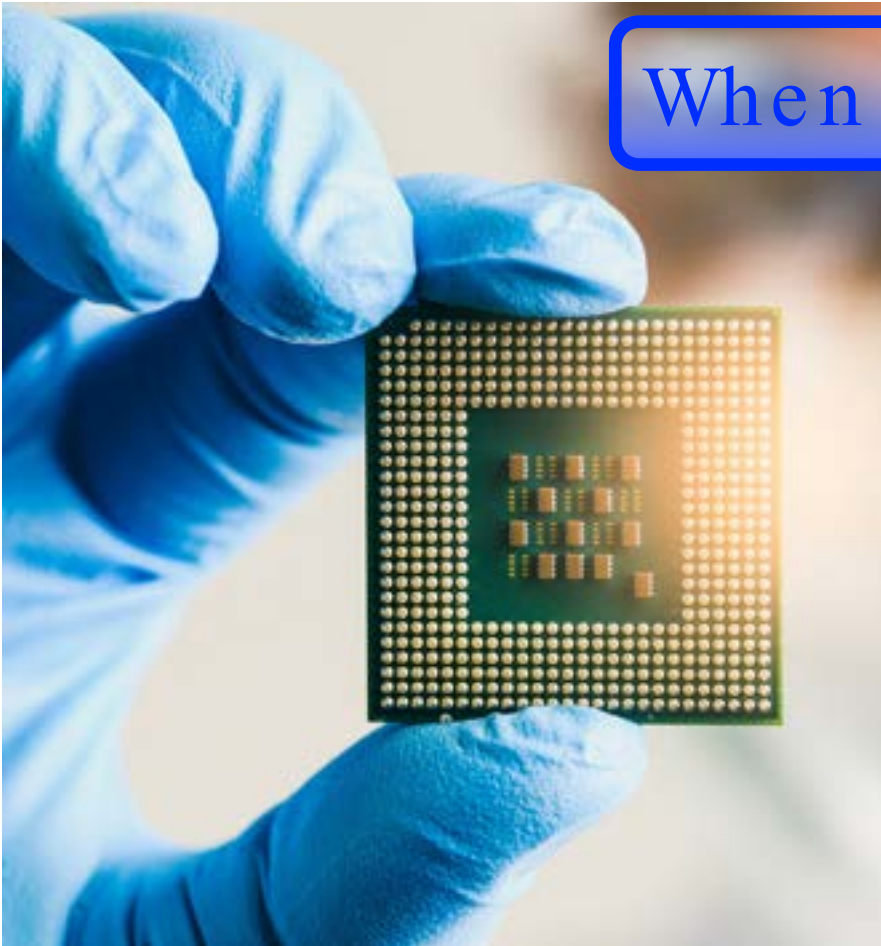
Appliction of concepts for
r-DMT, r-MMA, r-PS, r-CPL





Electricity storage and electronics

When purity is of the essence





Benefits with crystallization



Low energy consumption - the phase change liquid to solid requires 3 to 6 times less specific energy than liquid to vapor



As it is a cold process, it is perfect for heat sensitive products, therefore not generating any by-products



Yield + purity - yield is achieved without compromising purity



No solvent recovery and product is not contaminated with a solvent



Robust process, crystal growth control by “simple” cooling the melt






Thank you for your attention!

Your dedicated contacts at Sulzer for
Fractional Crystallization:



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These forward-looking statements are subject to change based on known or unknown risks and various other factors, which could cause the actual results or performance to differ materially from the statements made herein.