

CORE-SHELL CO(B)@WC POWDERS SYNTHESIZED BY ELECTROLESS PLATING FOR CEMENTED CARBIDES APPLICATIONS

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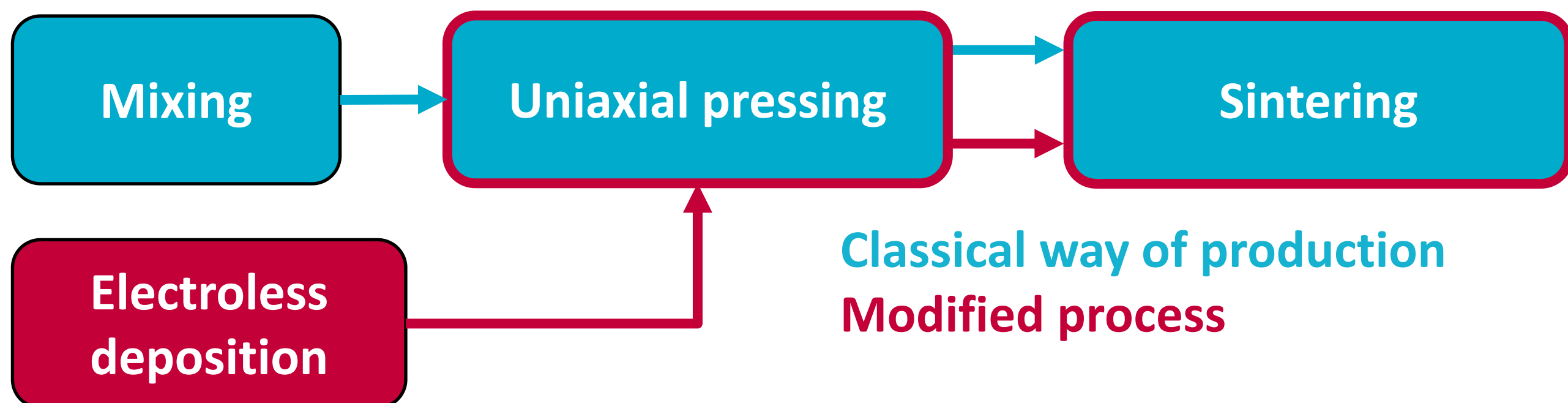
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Introduction

Hardmetal: WC-Co

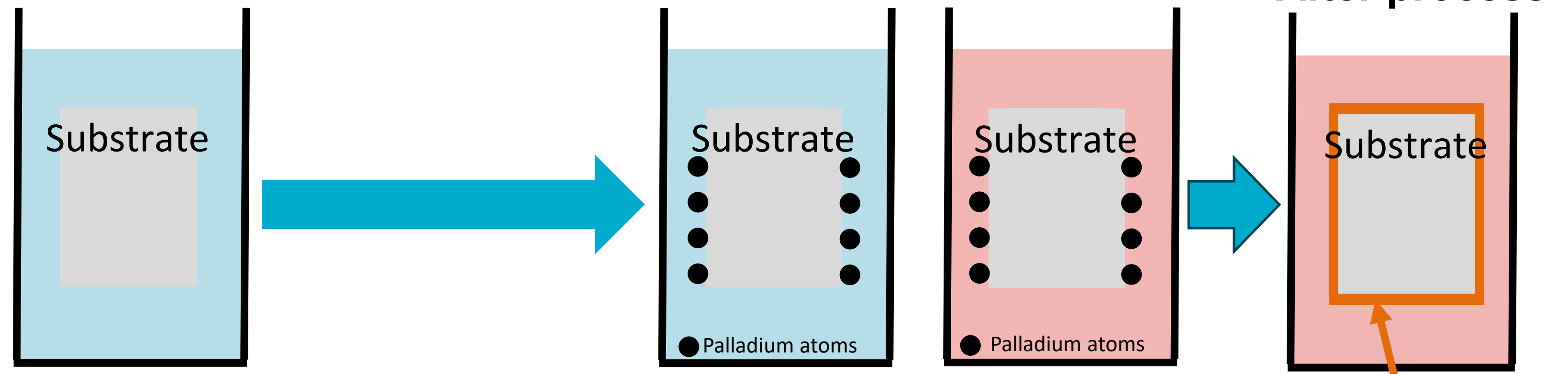


Ways of production



Electroless deposition

Reduction of metallic cations on the substrate



A pre-dip industrial solution to clean the surface
A catalyst solution (industrial) to activate the surface
Rinsing
Deposition bath
Metal deposited

Palladium activation steps for non-conductive substrates (such as tungsten carbide)

Powder handling

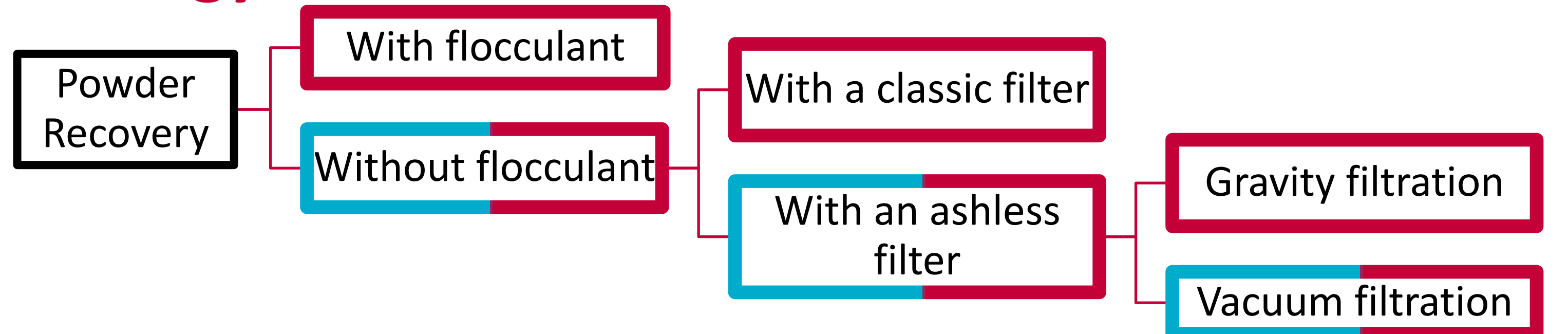
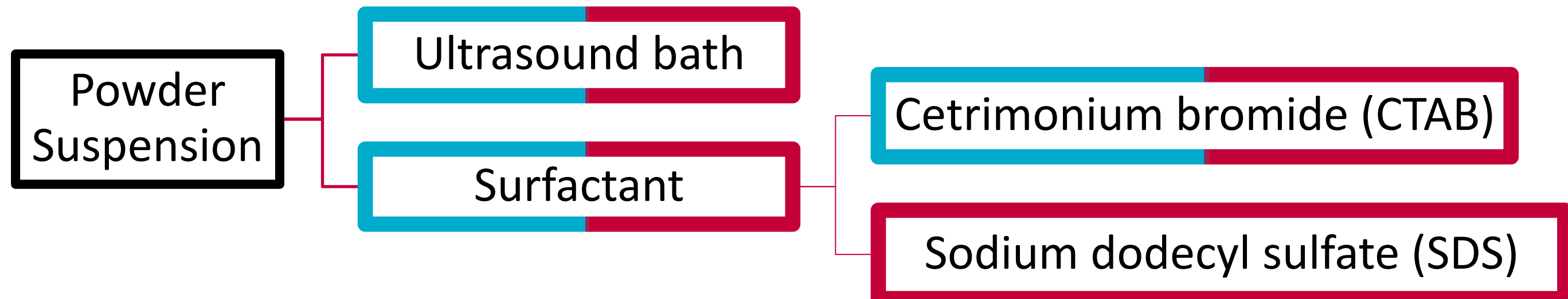
Issues with handling powder :

When thin powder is used + The density of WC is high, and the powder tends to sink

Powder recovery for the transfers between the process steps

Powder suspension to keep the grains in solution

Methodology



	Surfactant concentration [g/L]						
CTAB	0.00	0.45	0.60	0.75	1.00	1.20	2.00
SDS							

Solution at deposition bath pH composition with 1 g/L of powder in 200 mL of solution

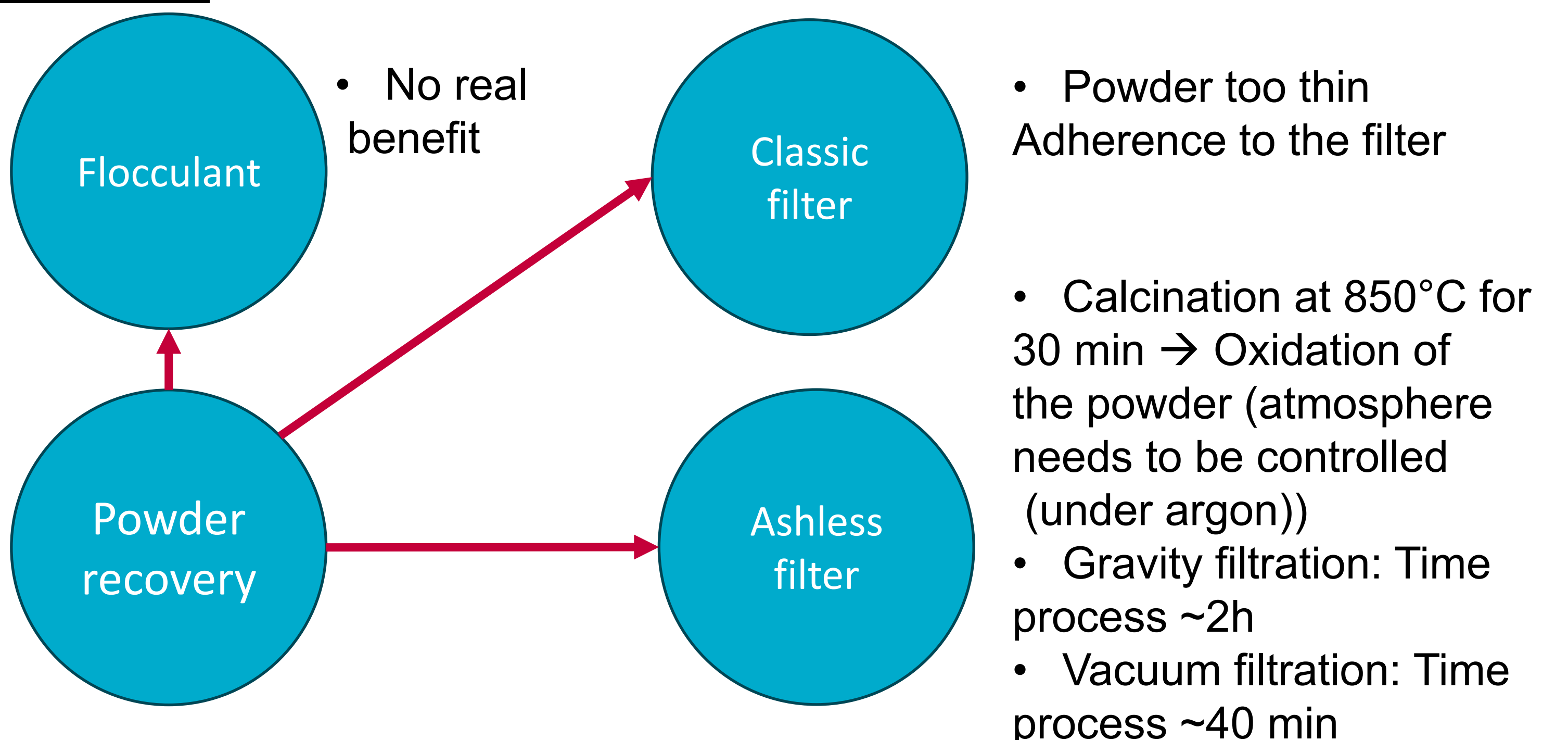
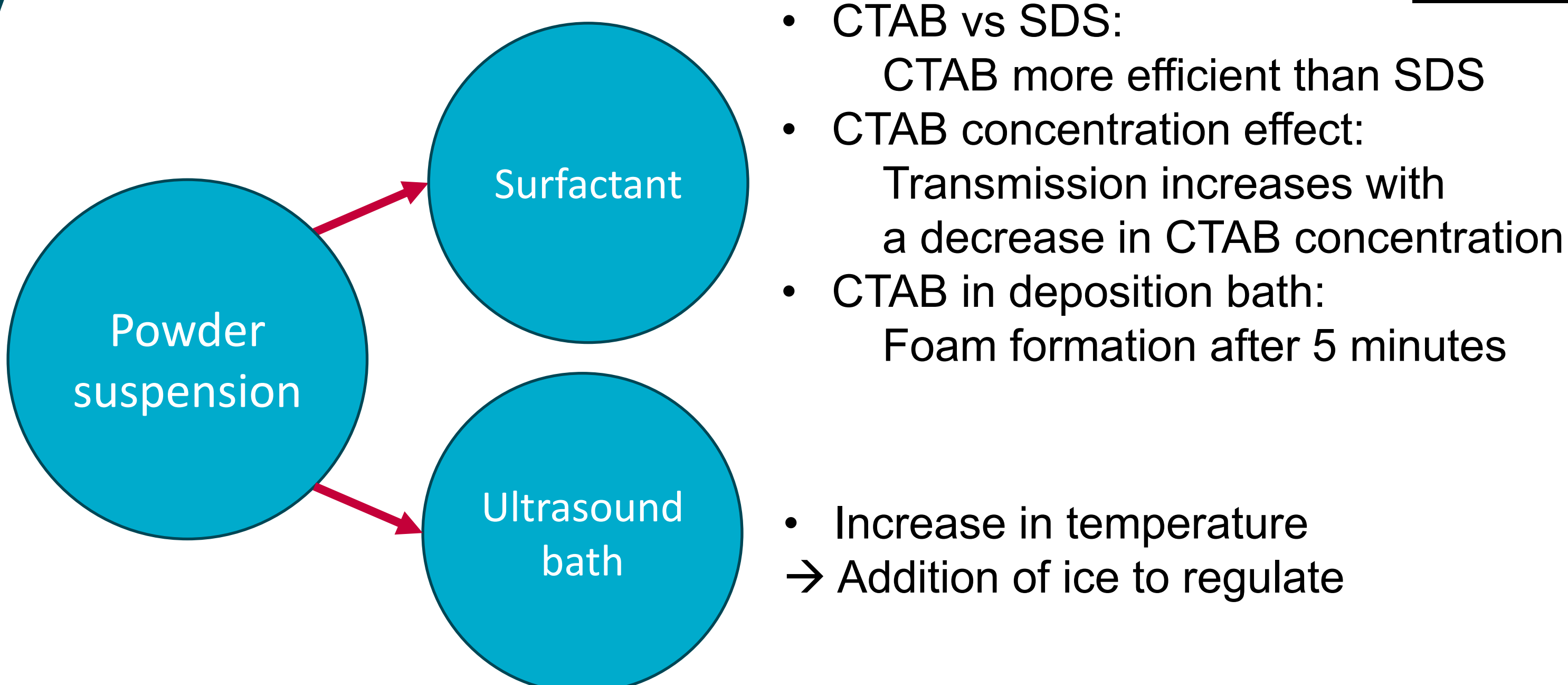
Chemicals	Concentration [g/L] ([mol/L])	Conditions
NaOH	0.4 (0.01)	Temperature 25°C pH 12-13

Deposition bath composition with 10 g/L of powder in 200 mL solution

Chemicals	Concentration [g/L] ([mol/L])	Conditions
CoCl ₂ ·6H ₂ O	47.58 (0.2)	Temperature 25°C
NH ₂ CH ₂ COOH	45.04 (0.6)	pH 12-13
NaBH ₄	0.8 (0.02)	Time variable

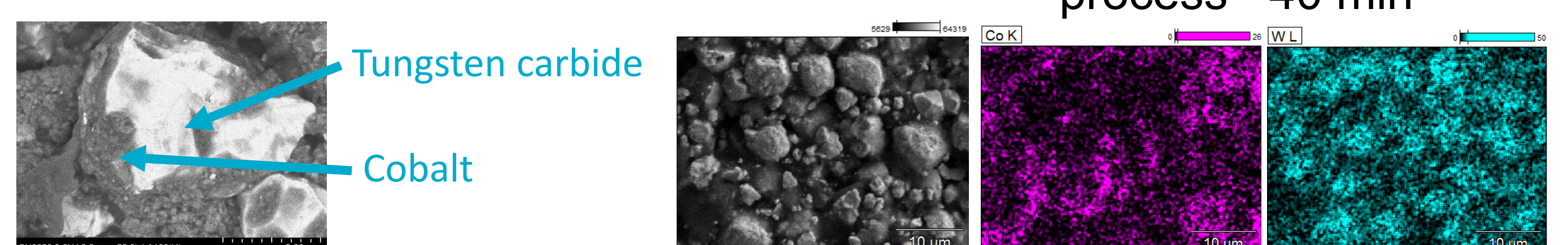
Results

Powder handling



Trial with cobalt deposition bath

Activation: (1) powder directly in the filter (2) solutions poured on the powder (3) dry and calcination of the filter
Deposition bath (time: 1h): with ultrasound, ashless filter and vacuum filtration



Conclusions and perspectives

- Powder handling:**
 - Powder suspension: ultrasound bath
 - Powder recovery: ashless filter + vacuum filtration
- Deposition powder:** Trial with the adaptations leads to a cobalt deposition on the powder
- Optimisation of bath composition to increase the amount of powder

Acknowledgments

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