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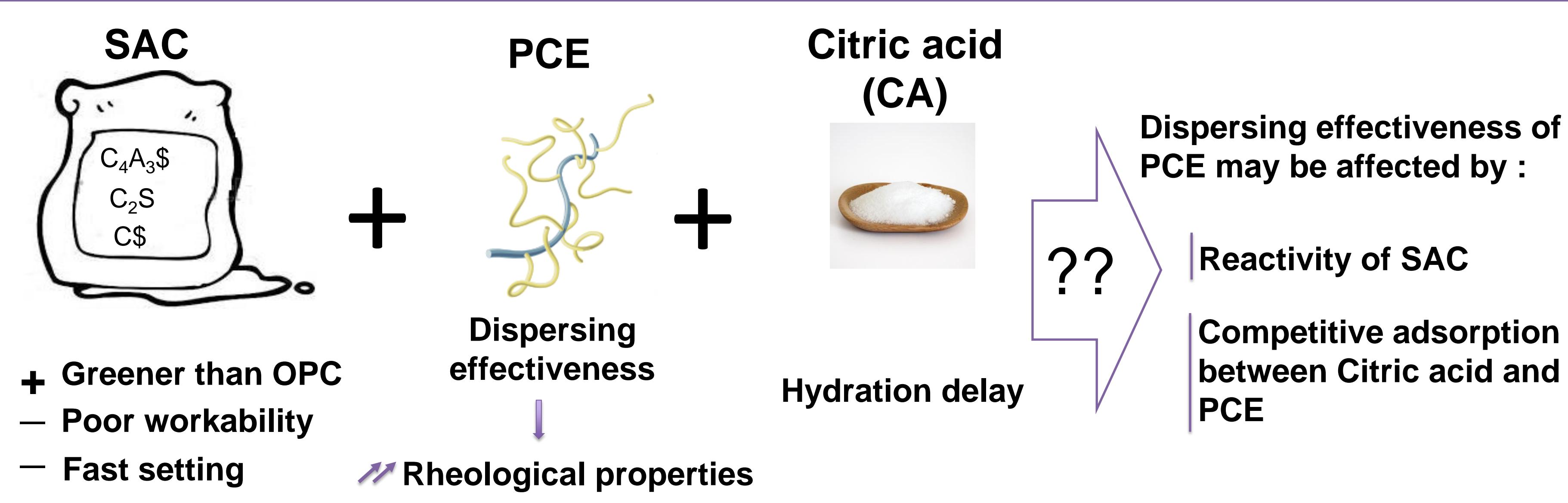
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Hydration and rheology of sulfoaluminate-belite cements (SAC) in presence of polycarboxylate superplasticizers (PCE) and citric acid

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1. Context

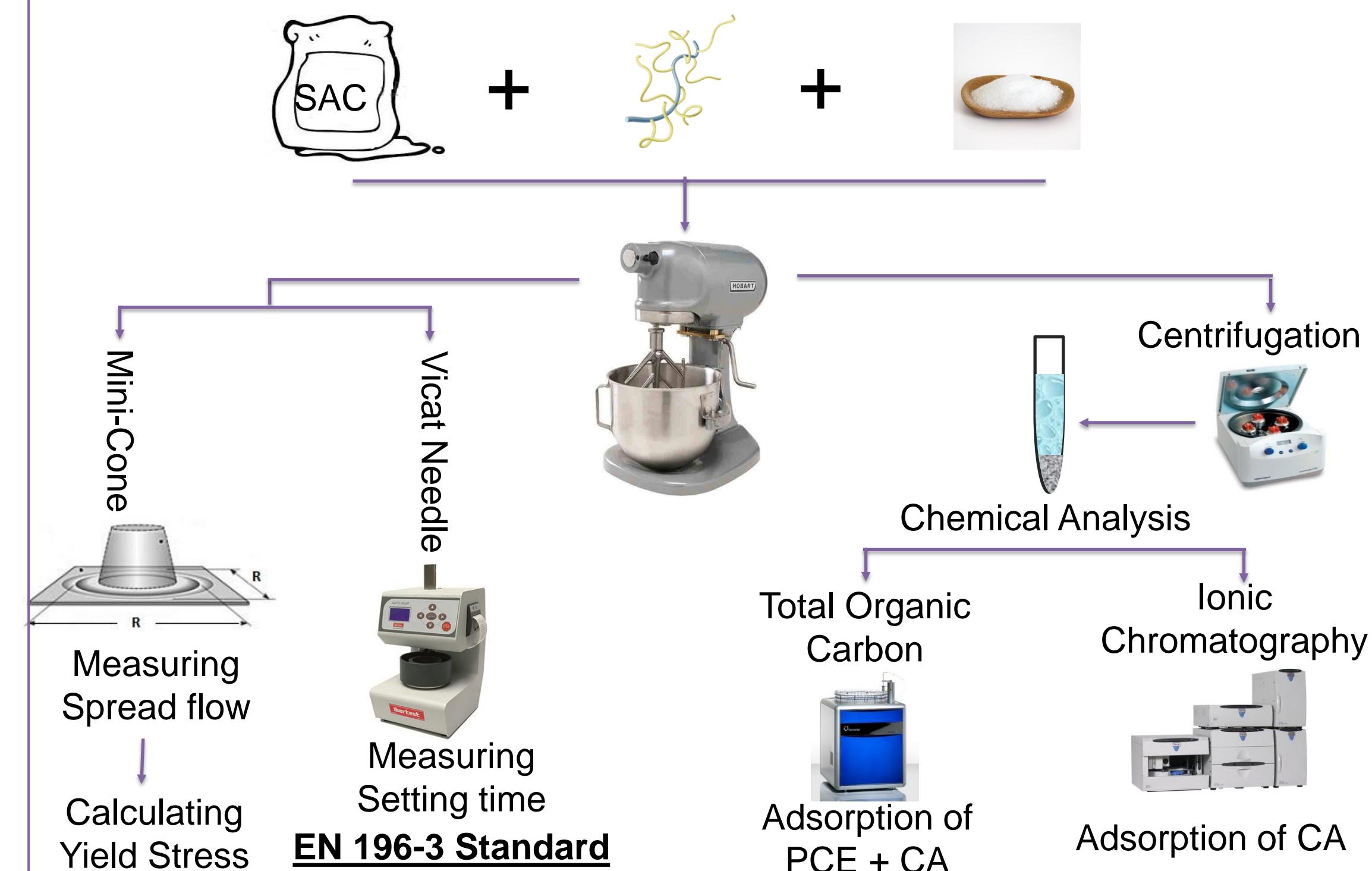


2. Objectives

Understand the :

- Effect of the chemical structure of PCE on the hydration and rheology of reactive SAC
- Effect of combination of citric acid with PCE on hydration and rheology of reactive SAC

4. Methods

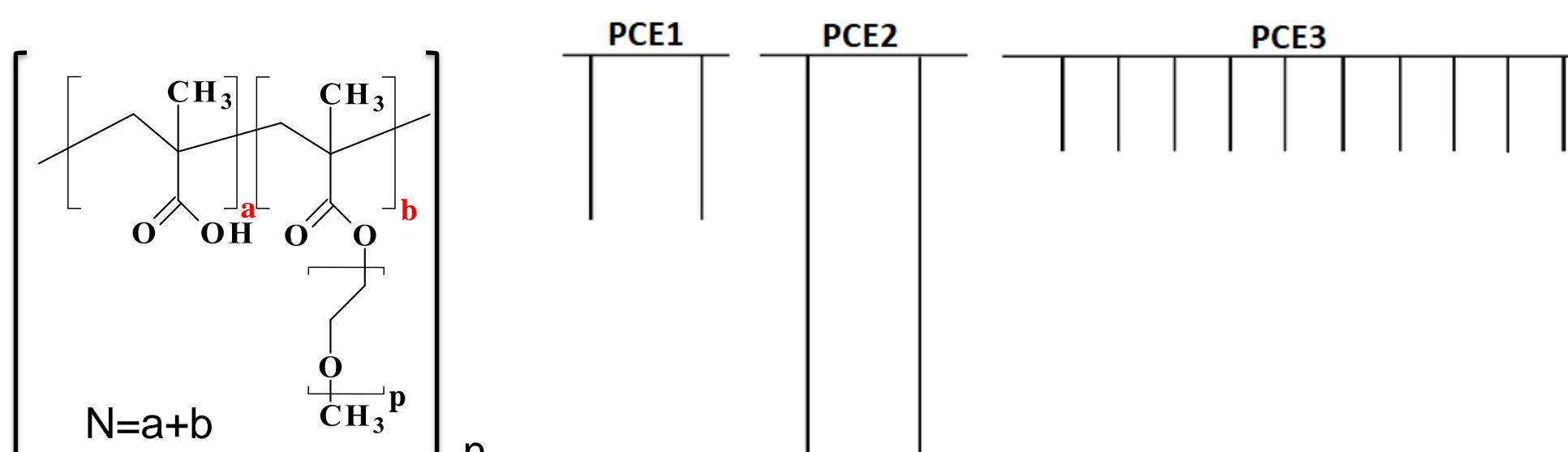


3. Materials

- Commercial SAC (i.tech ALI CEM)
- Citric acid (99,5% Honeywell)
- 3 polycarboxylates ethers (PCE1, PCE2 and PCE3)

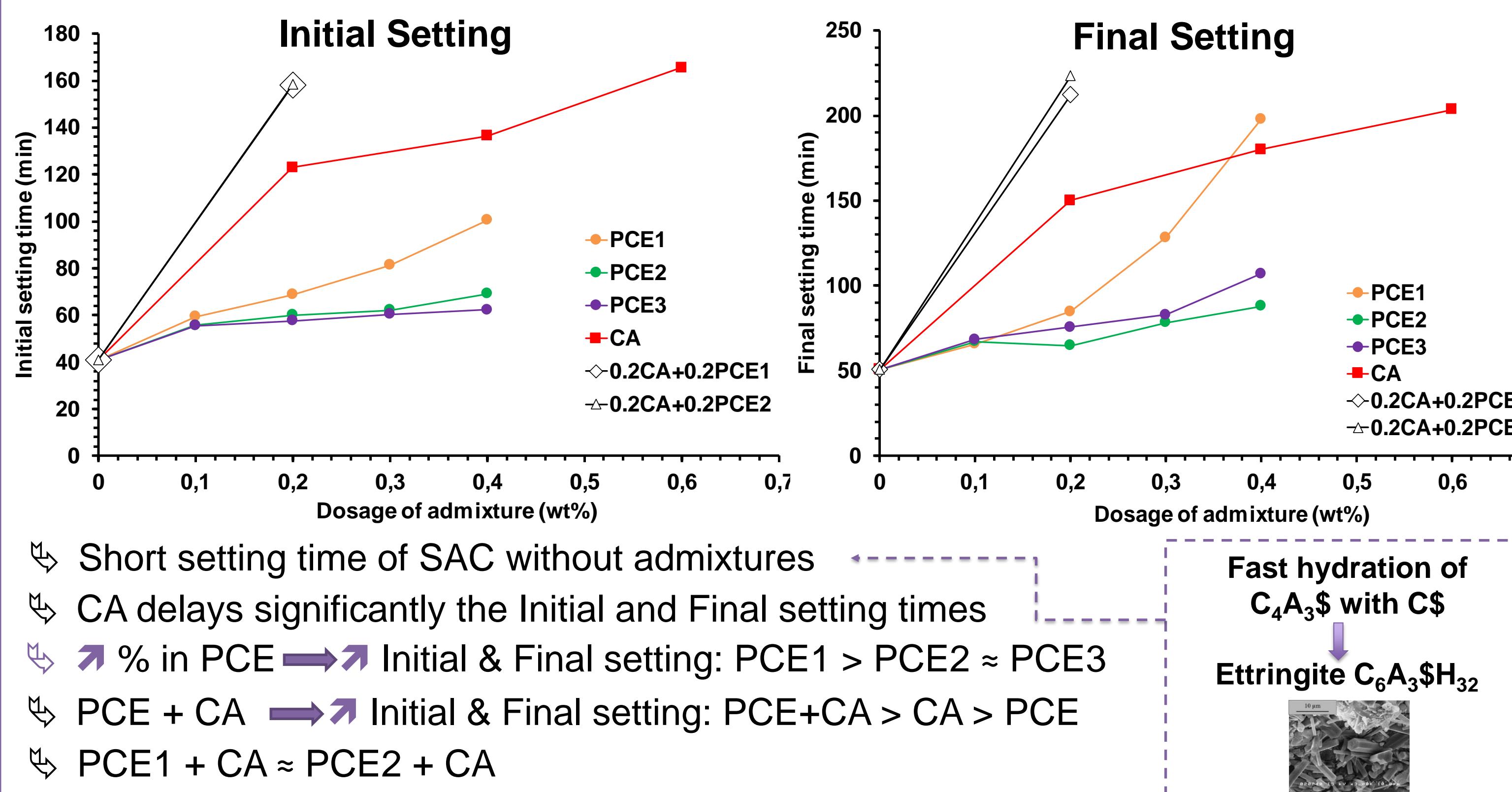
Phase composition of SAC (%)		C ₄ A ₃ \$	C ₂ S	C\$
49,3	15,1	23,5		

	Mw (g/mol)	Charge density (mmol/g)	P	N	n
PCE1	48300	0,79	45	5	12
PCE2	138600	0,3	114	5	15
PCE3	11900	0,96	17	2,5	115

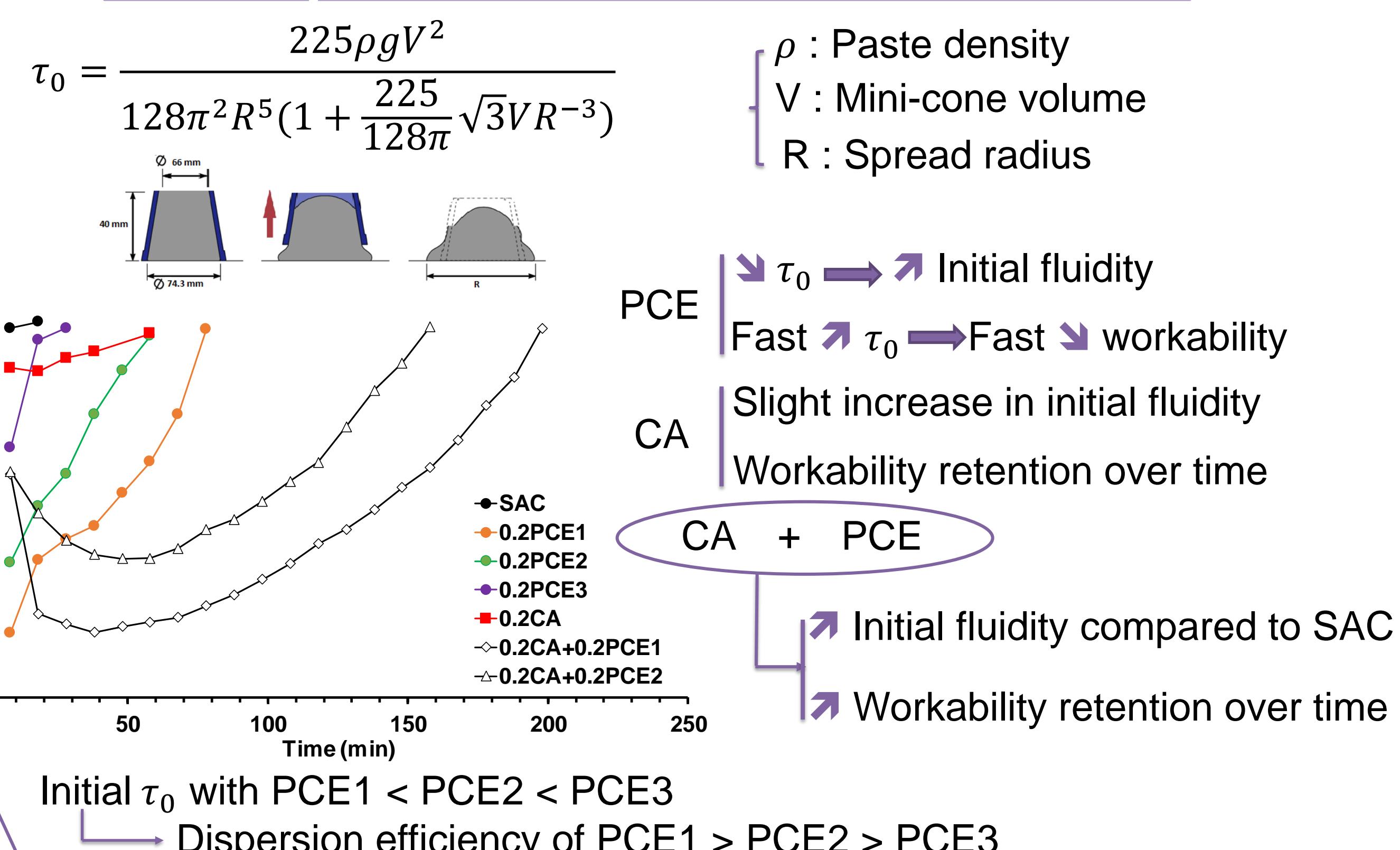


5. Results

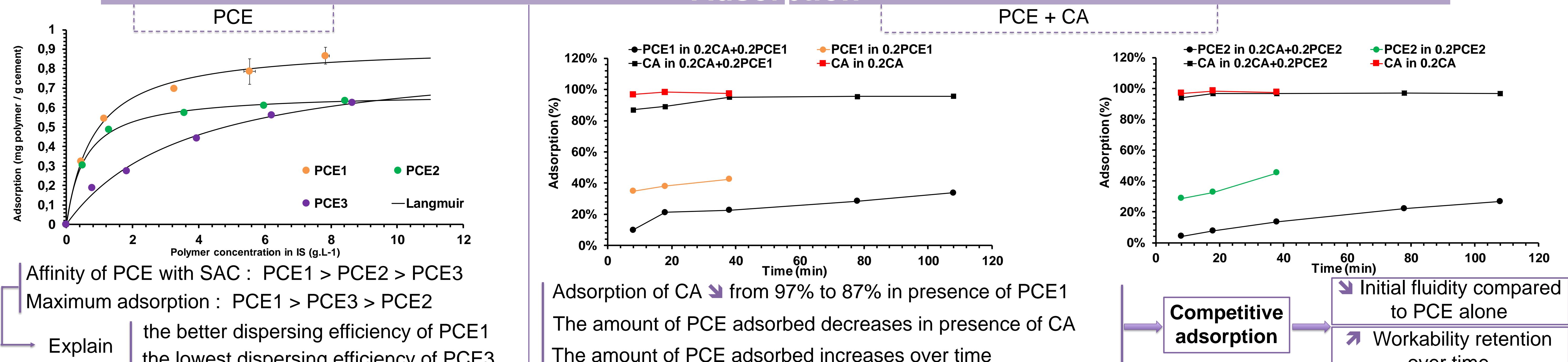
Setting-Time



Spread flow / Yield stress



Adsorption



6. Conclusions & Perspectives

PCE

- Setting time** : PCE1 > PCE2 ≥ PCE3
- Dispersing effectiveness** : PCE1 > PCE2 > PCE3
- Adsorption** : PCE1 > PCE2 > PCE3

TGA & DRX are required to follow the hydration

Rheological properties

CA

- Setting time** : CA > PCE
- Adsorption** : CA > 97% >> PCE

The amount of PCE consumed by intercalation

CA + PCE

- Setting time** : PCE + CA > CA > PCE
- Adsorption** : CA > 87% > PCE & PCE < PCE alone
- Effect**
 - Initial fluidity compared to PCE alone
 - Workability retention over time

CA reduces the amount of ettringite at early age

Hypothesis

- Setting time : PCE + CA > CA > PCE
- Adsorption : CA > 87% > PCE & PCE < PCE alone
- Effect
 - Initial fluidity compared to PCE alone
 - Workability retention over time