

Pea protein at the interface: Insights into adsorption and interfacial rheology

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Motivation

Plant proteins have become popular substitutes for animal proteins in food emulsions.

Advantages



Limitations of unmodified plant proteins

- Low solubility
- Low hydrophobicity
- Sensitive to environment
- Less surface active

Research question

Can we modify the plant proteins to have better surface activity, adsorption, and rheological properties at interface?

Big picture

- Identification of modification techniques for achieving desired performance
- Characterize interfacial properties

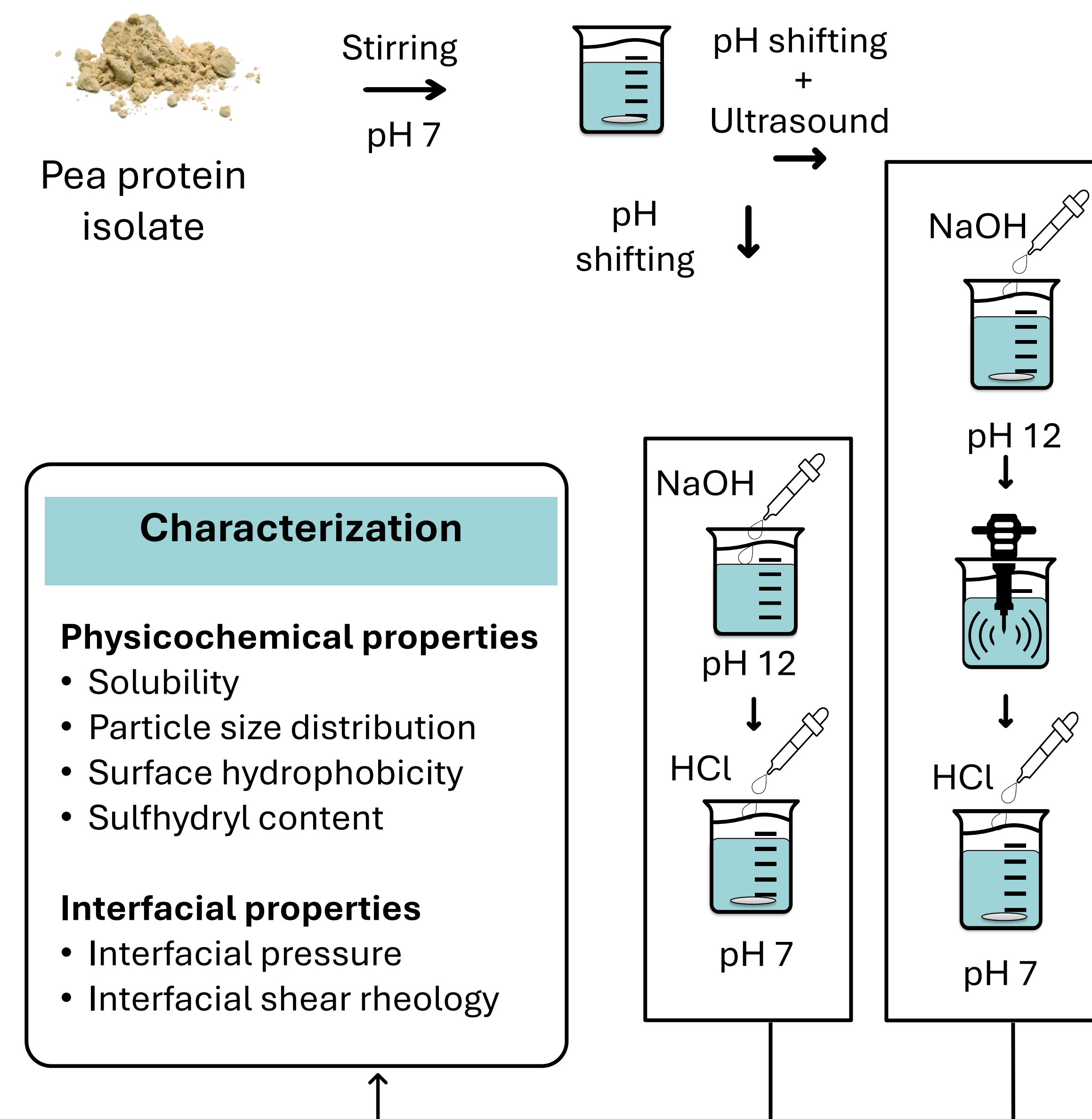
Conclusion

- ❖ Modifications improved the solubility, decreased the particle size, and exposed hydrophobic amino groups
- ❖ Modified proteins showed less affinity towards the interface and formed less viscoelastic films

How we did it!!

Types of modification used

Pea protein isolate was modified using alkaline pH shifting and ultrasonication (60% amplitude).



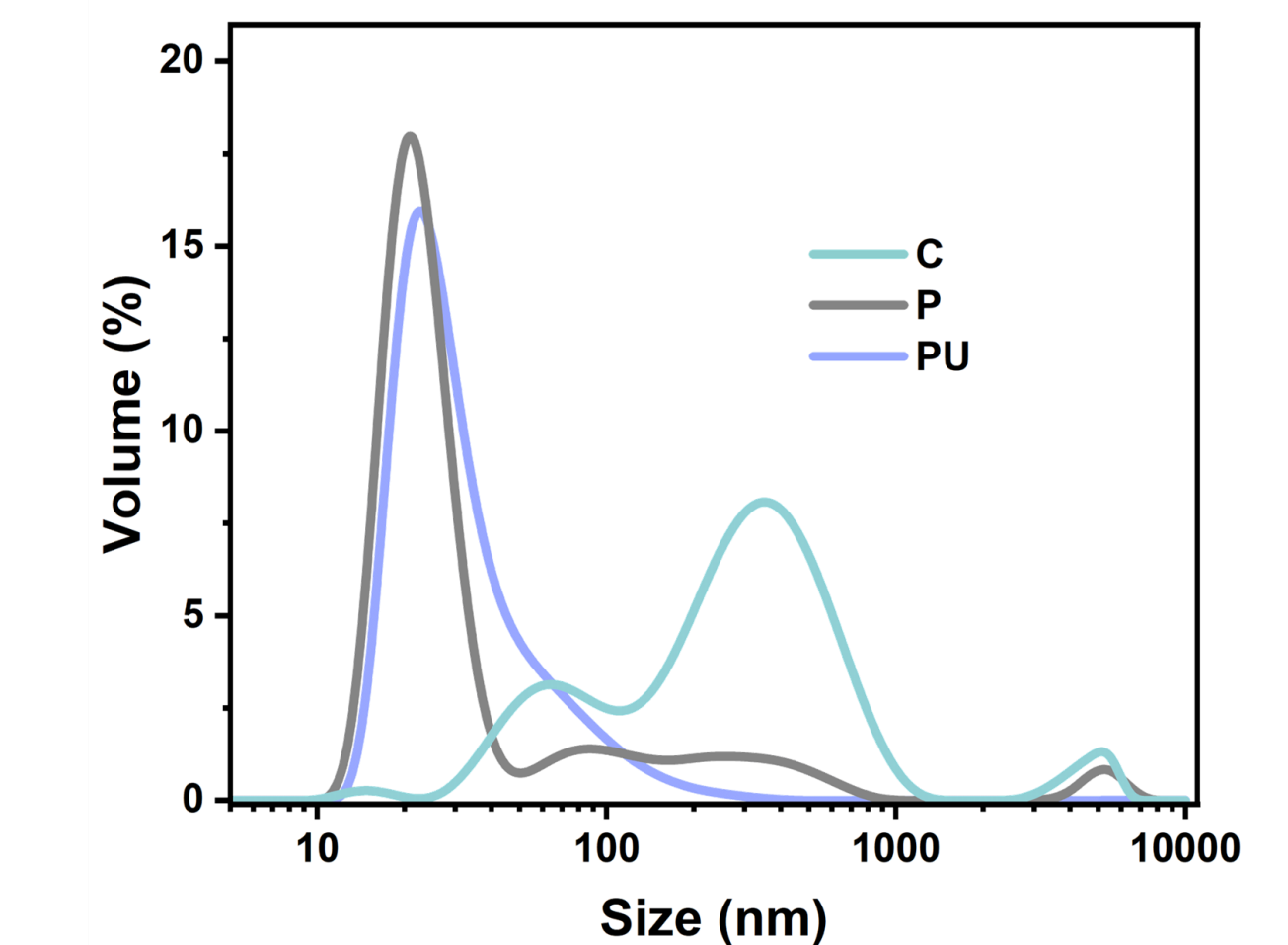
Breakthrough moments

Physicochemical properties

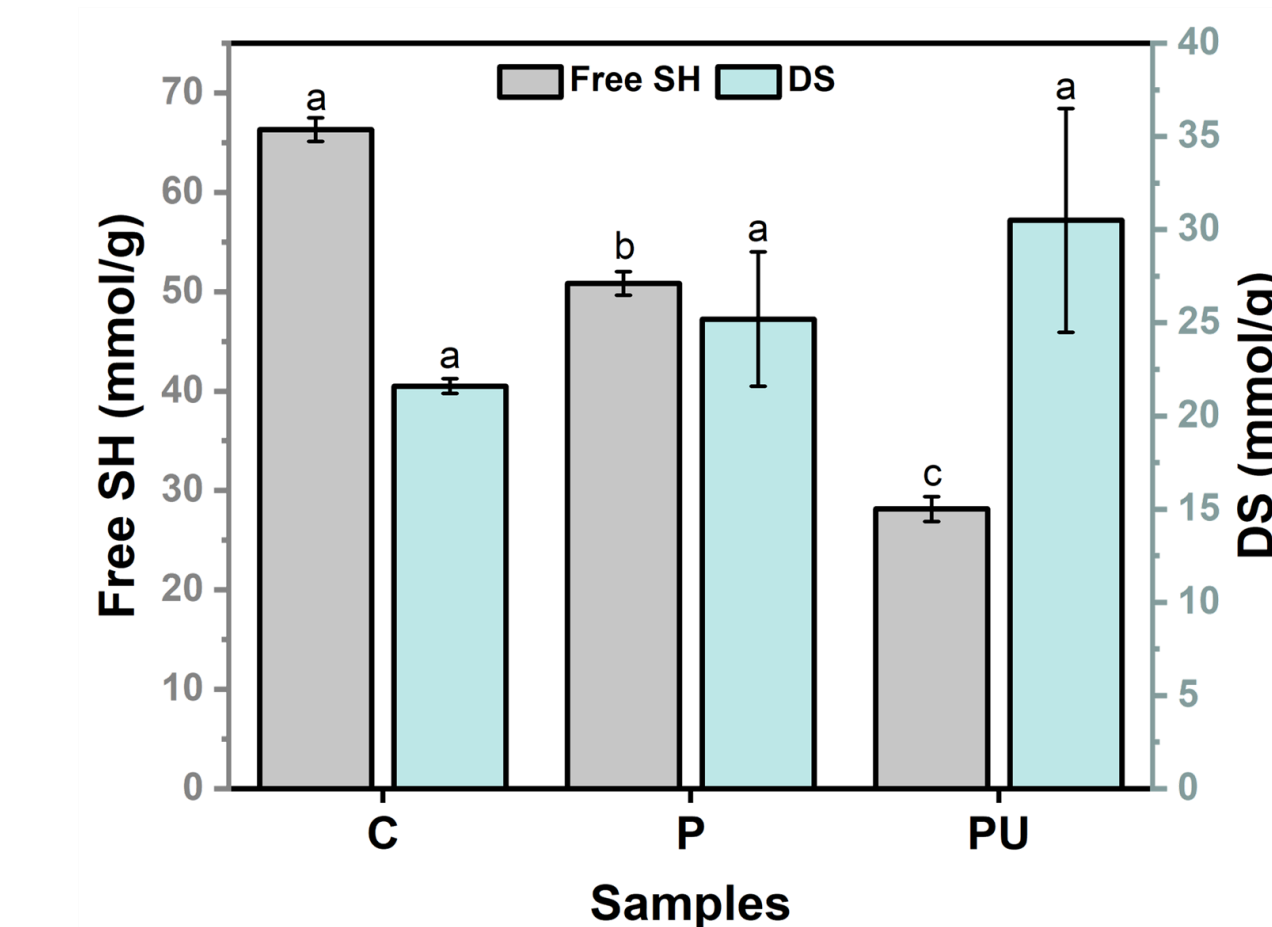
Protein solubility

Samples	Sample codes	Solubility
Control	C	13.8 ± 0.2^a
pH shifting	P	44 ± 4^b
pH shifting + ultrasound	PU	78 ± 2^c

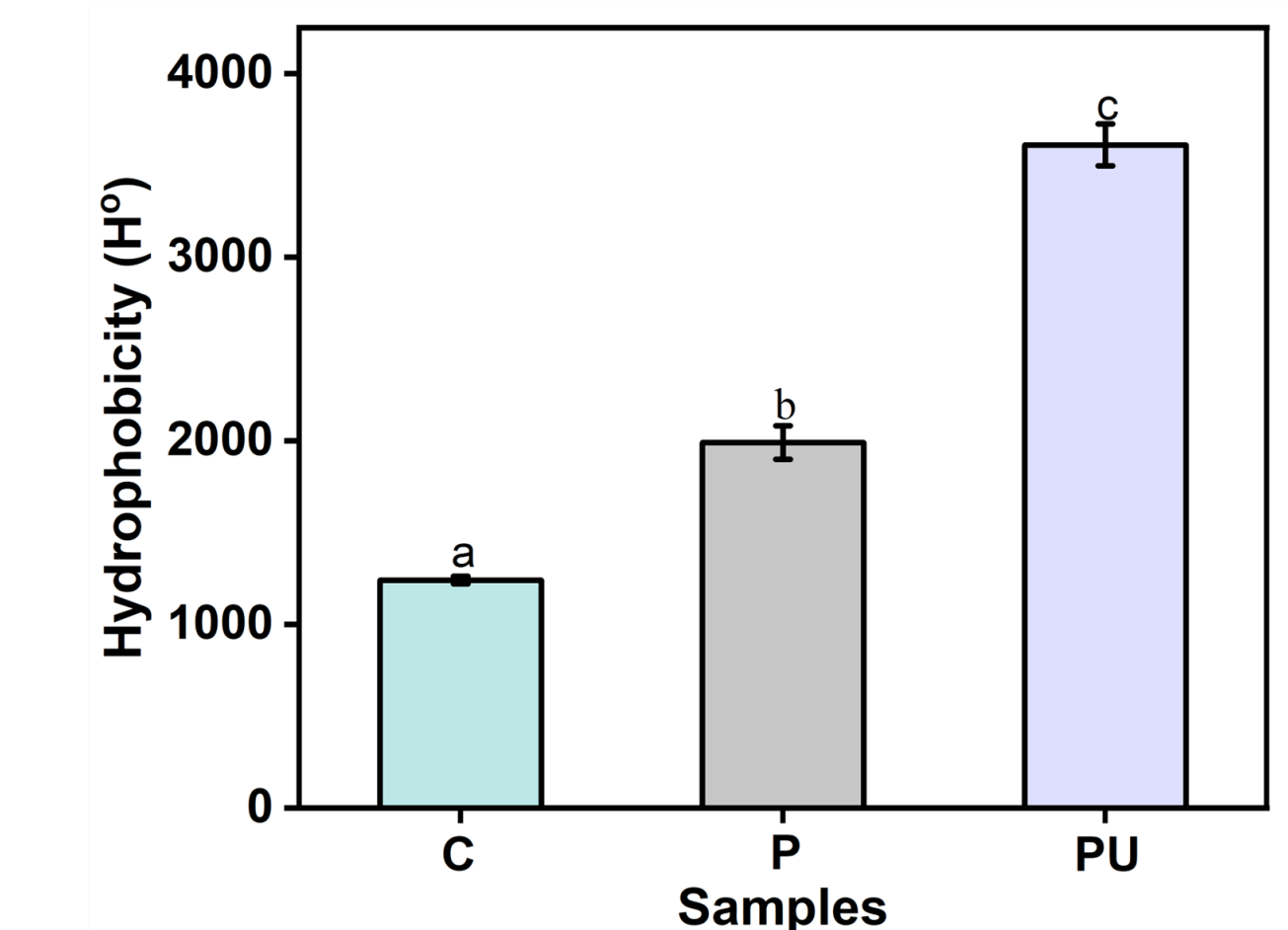
Particle size distribution



Free sulfhydryl (SH) and disulfide (DS) bond content

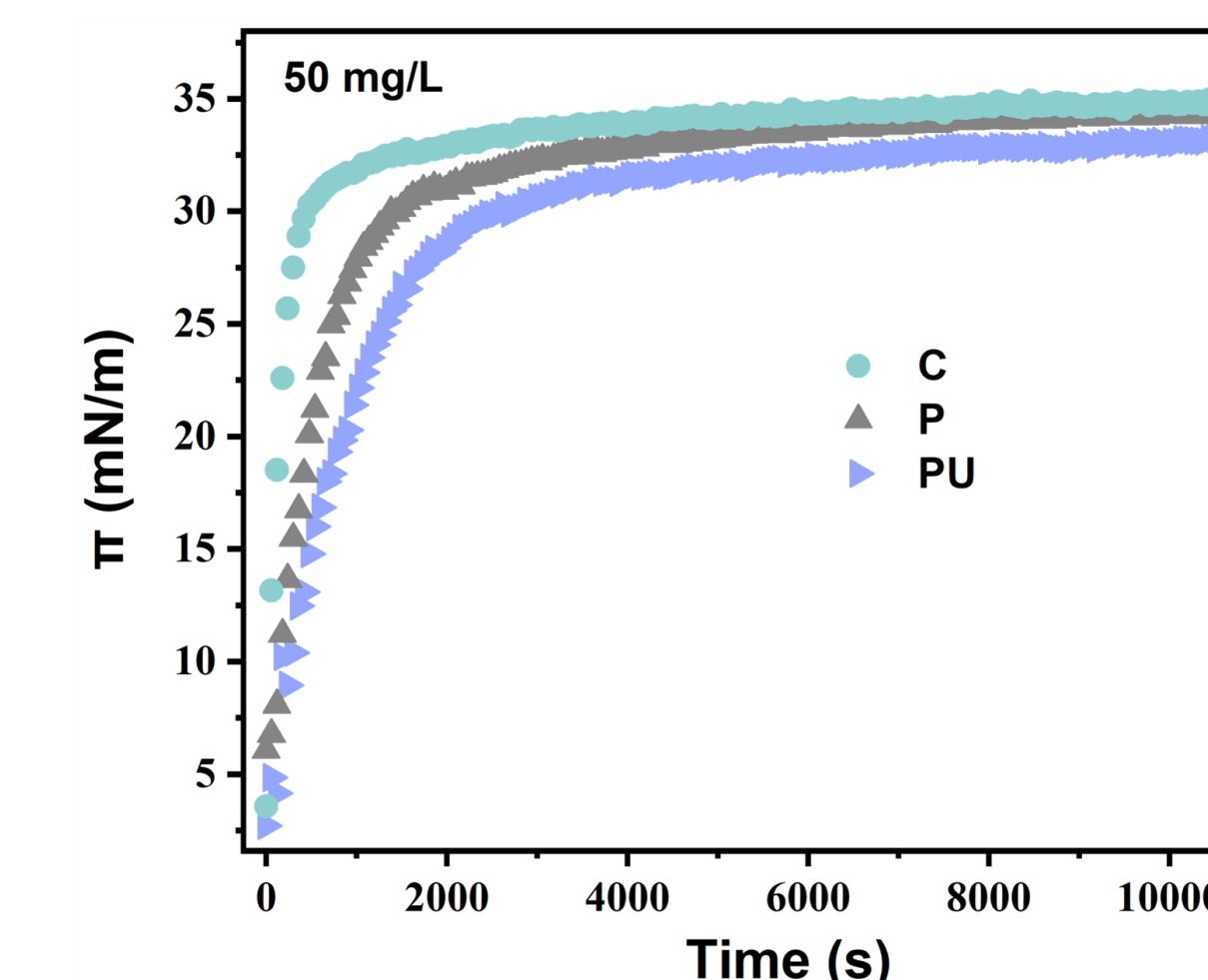
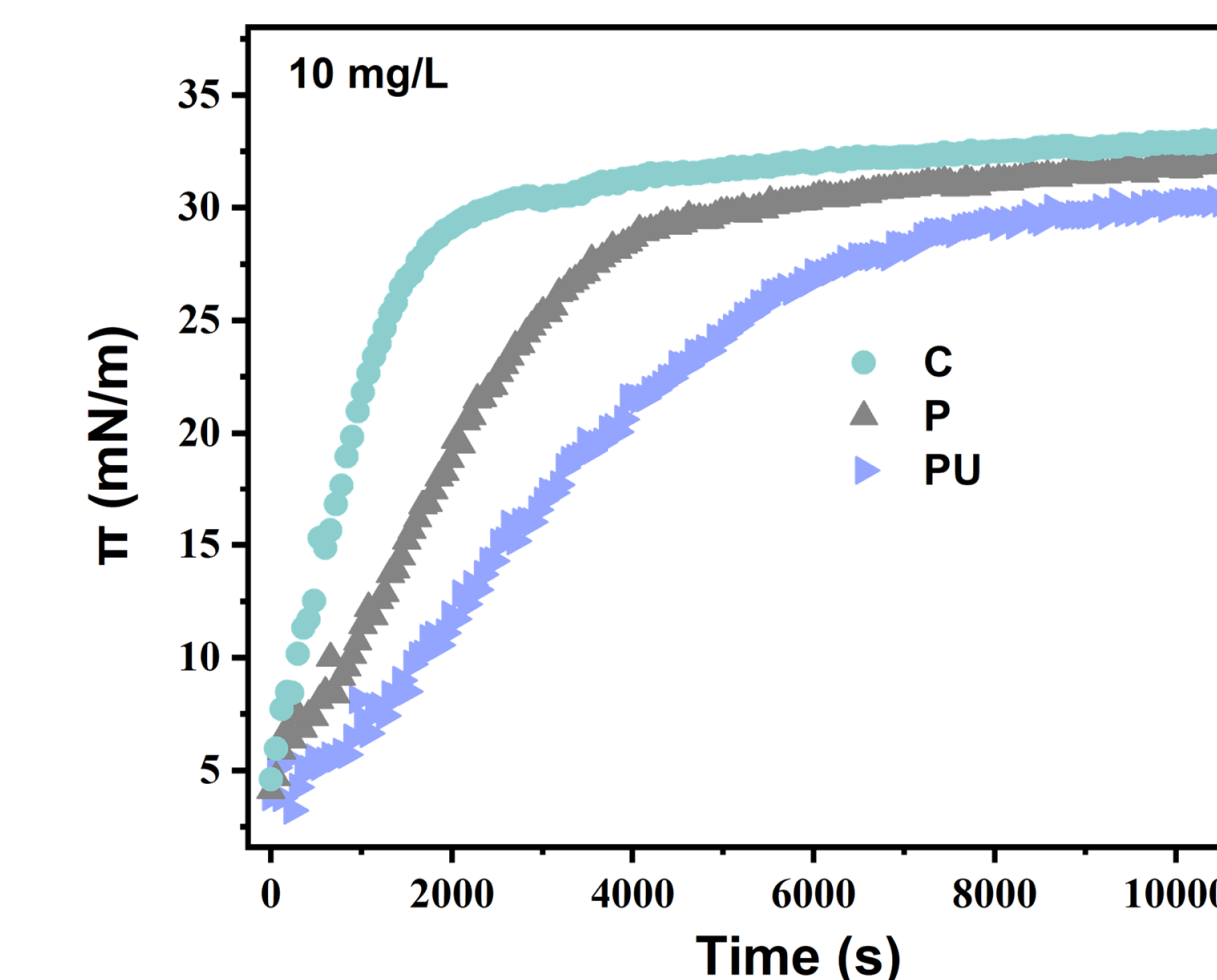


Surface Hydrophobicity



The big reveal!!!

Interfacial adsorption



Interfacial shear rheology (at 10 mg/L)

