

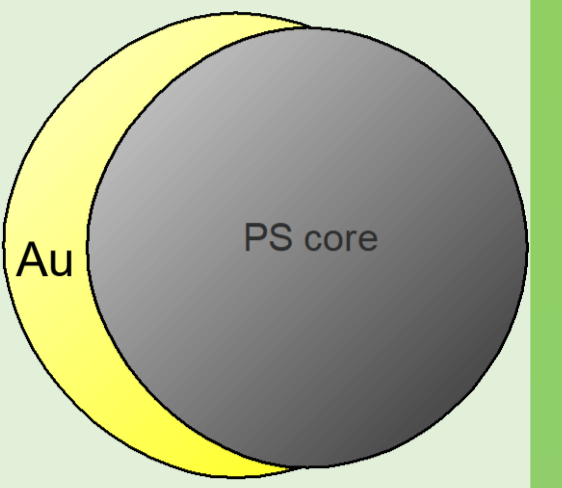
# The Synthesis of Polystyrene-Gold Janus Particles

Maartje Wolters

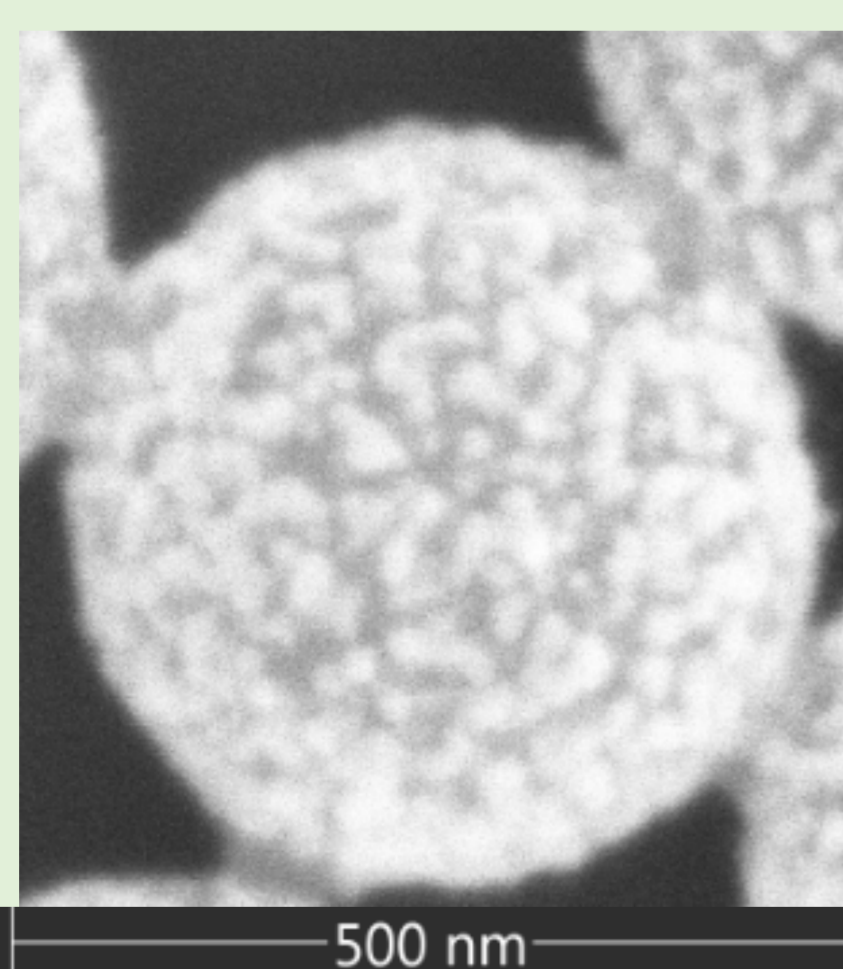
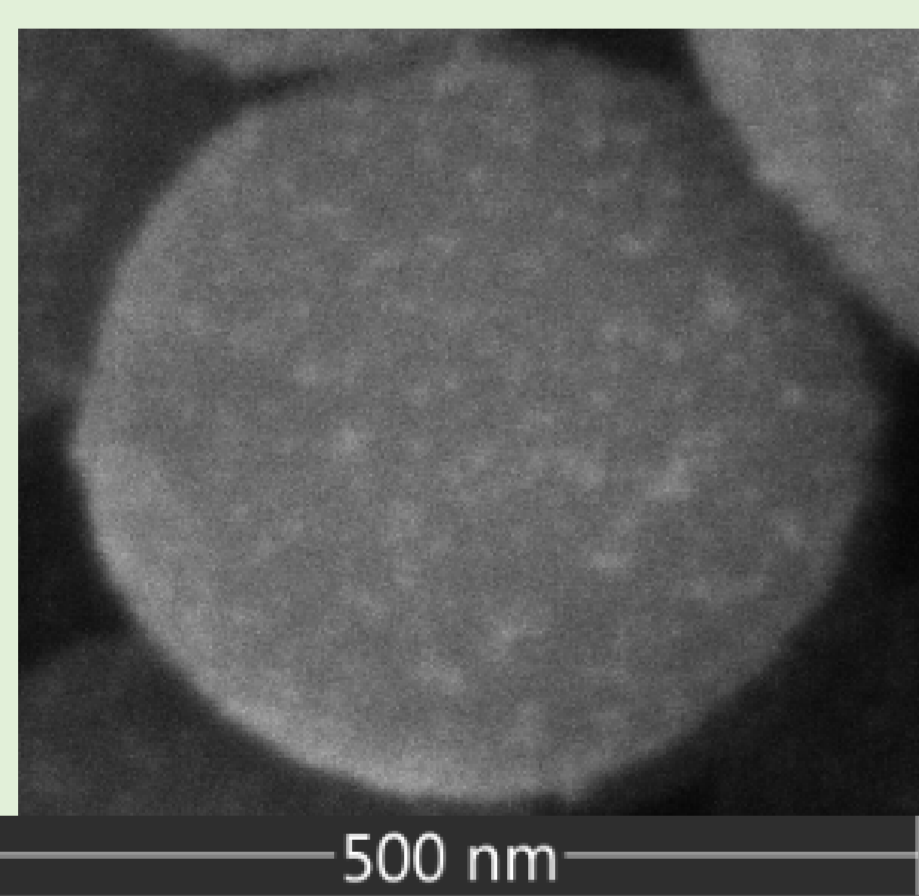
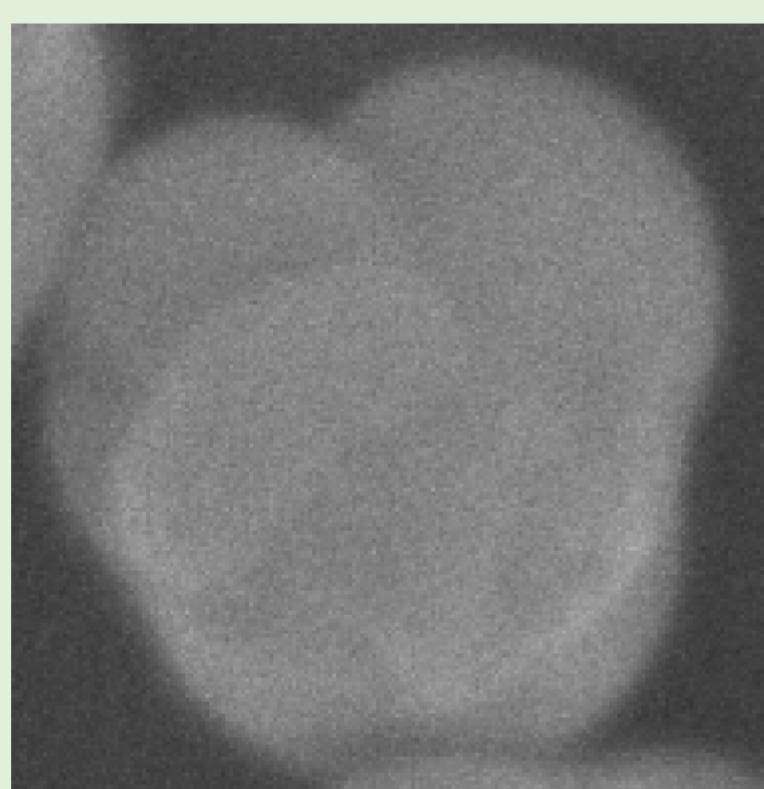
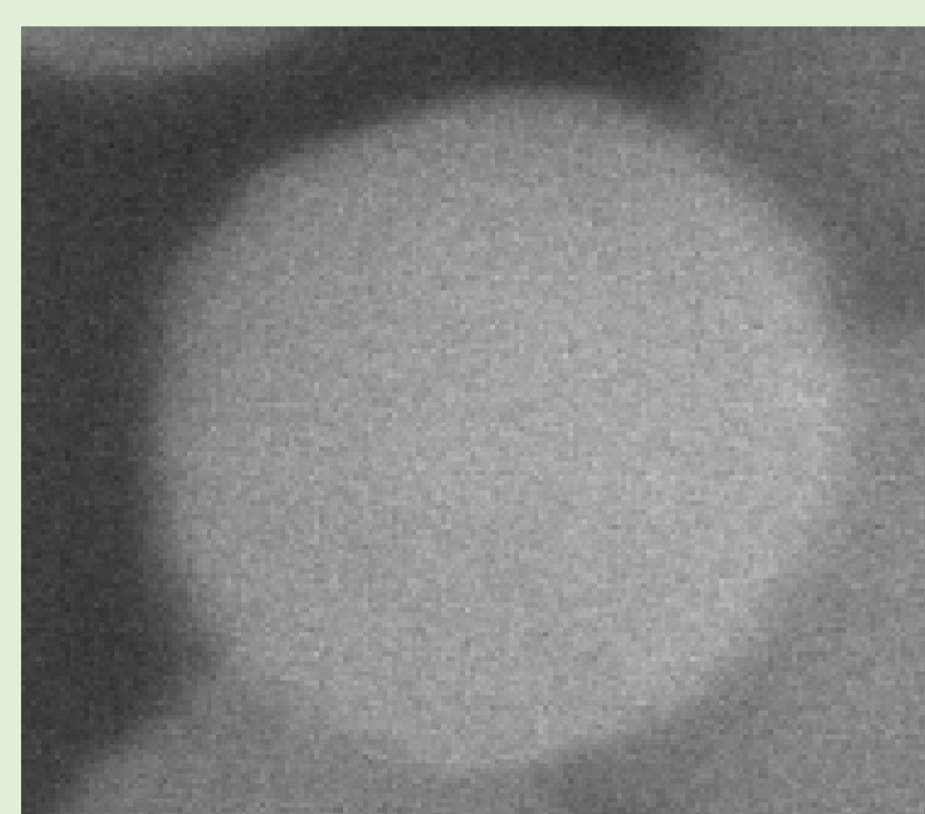
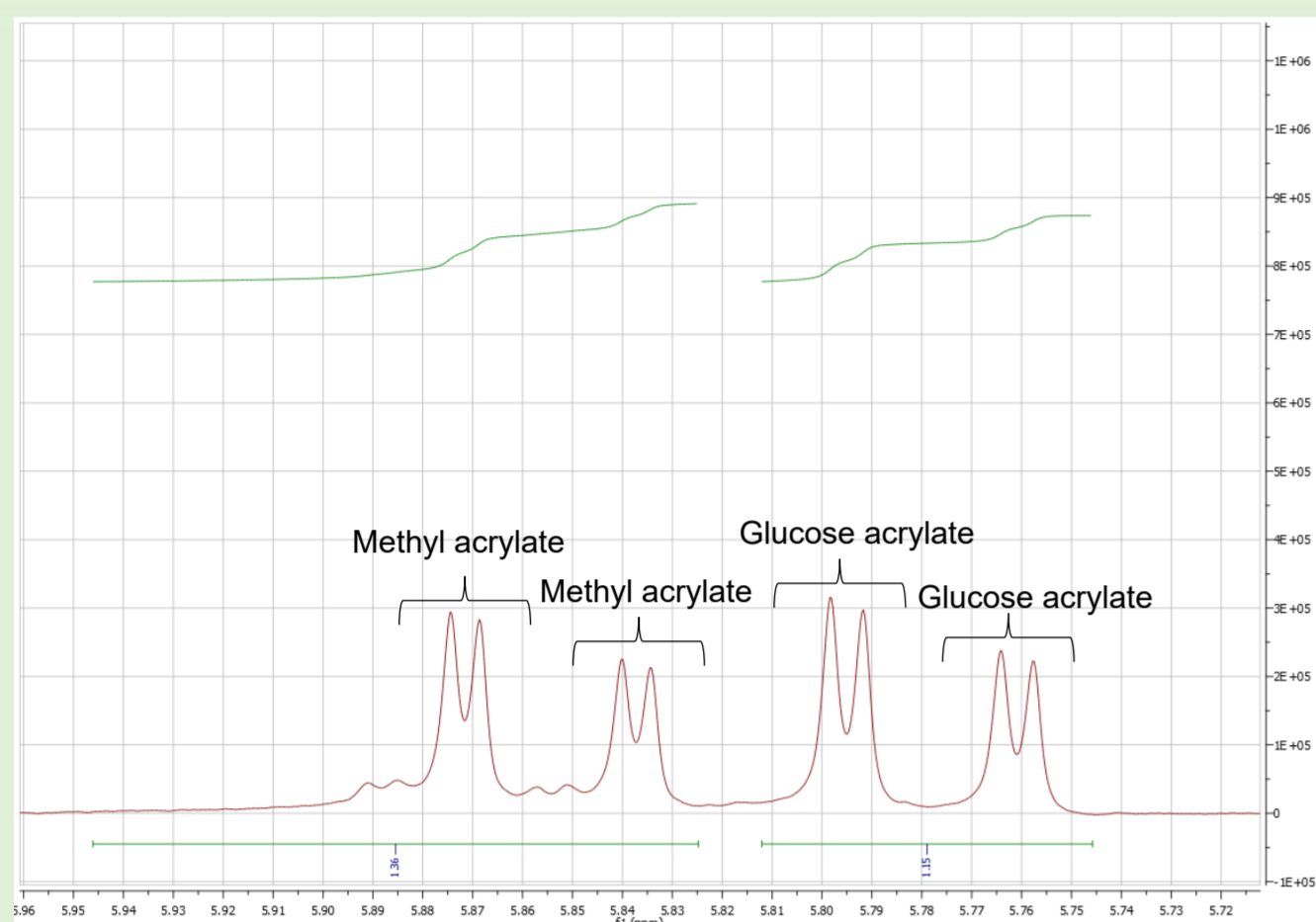
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## Introduction

- Two sided colloidal metal nanoparticles → different chemistry or polarity → Janus particles
- Gold nanoshells show angle dependent plasmonic properties and can be used for e.g. optical applications
- Main goal: Synthesize polystyrene-gold Janus particles with a core size of approximately 250 nm and 40-50% of the surface covered by a homogeneous gold shell of 10-20 nm thickness

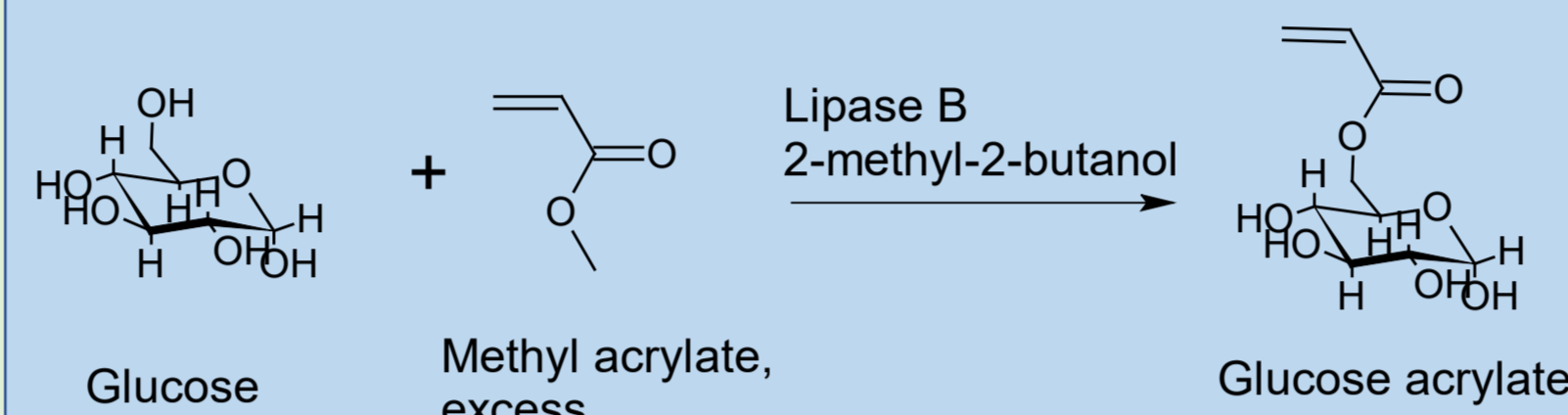


## Results

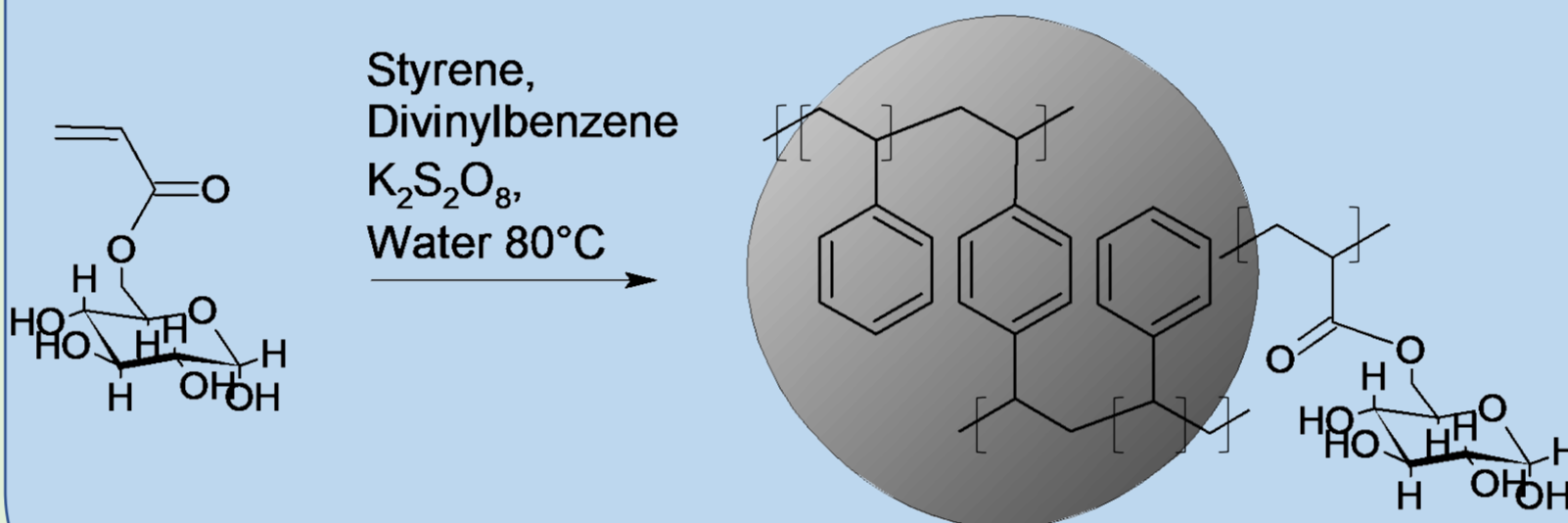


## Experimental set up

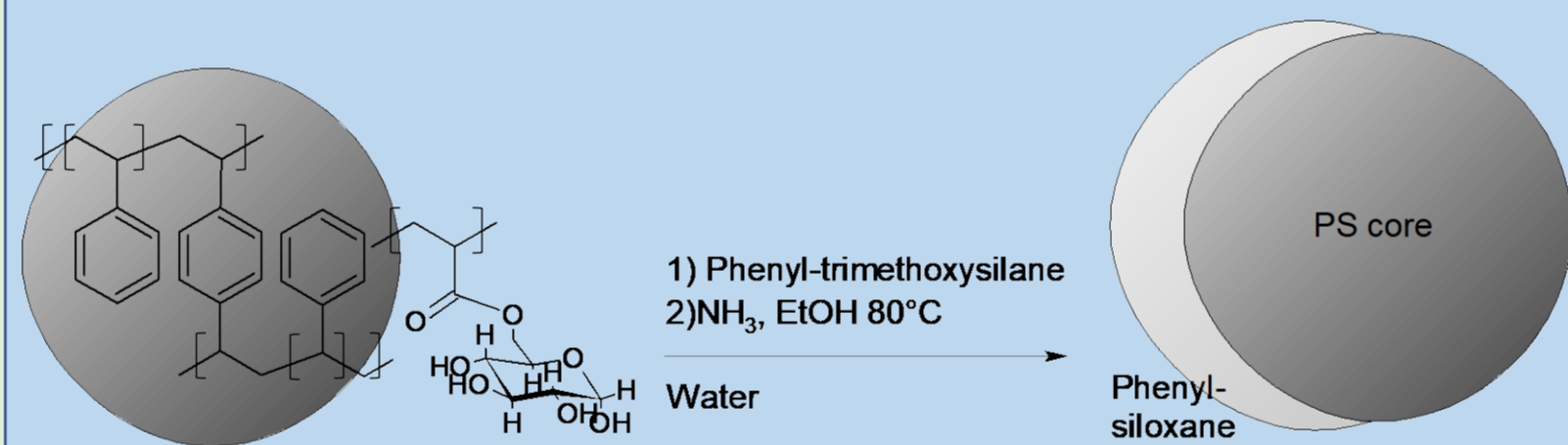
### Enzymatic transacylation



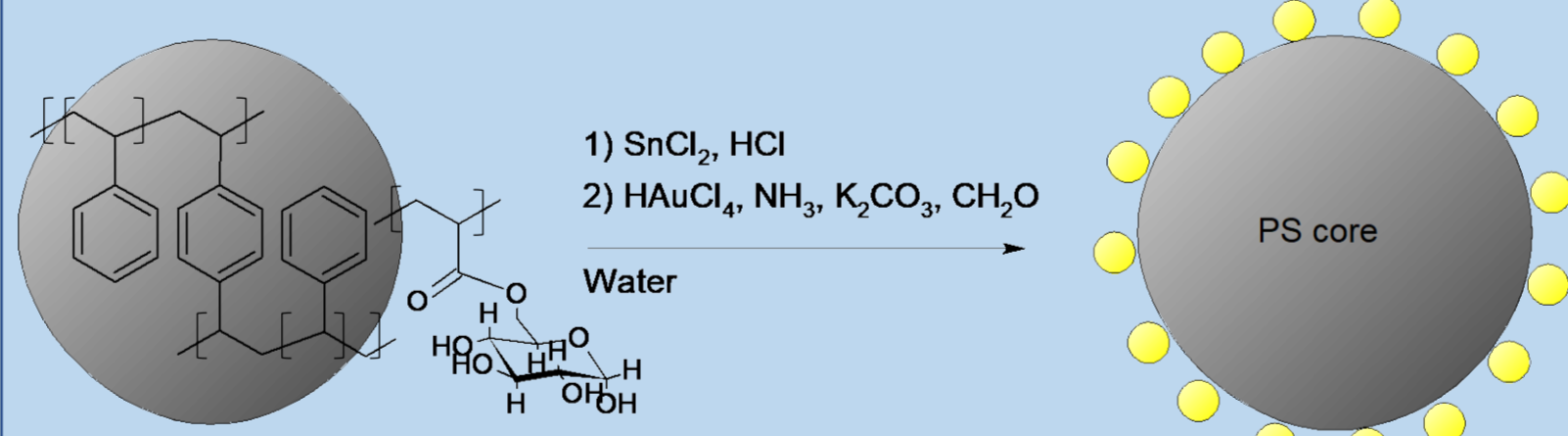
### Emulsion polymerisation



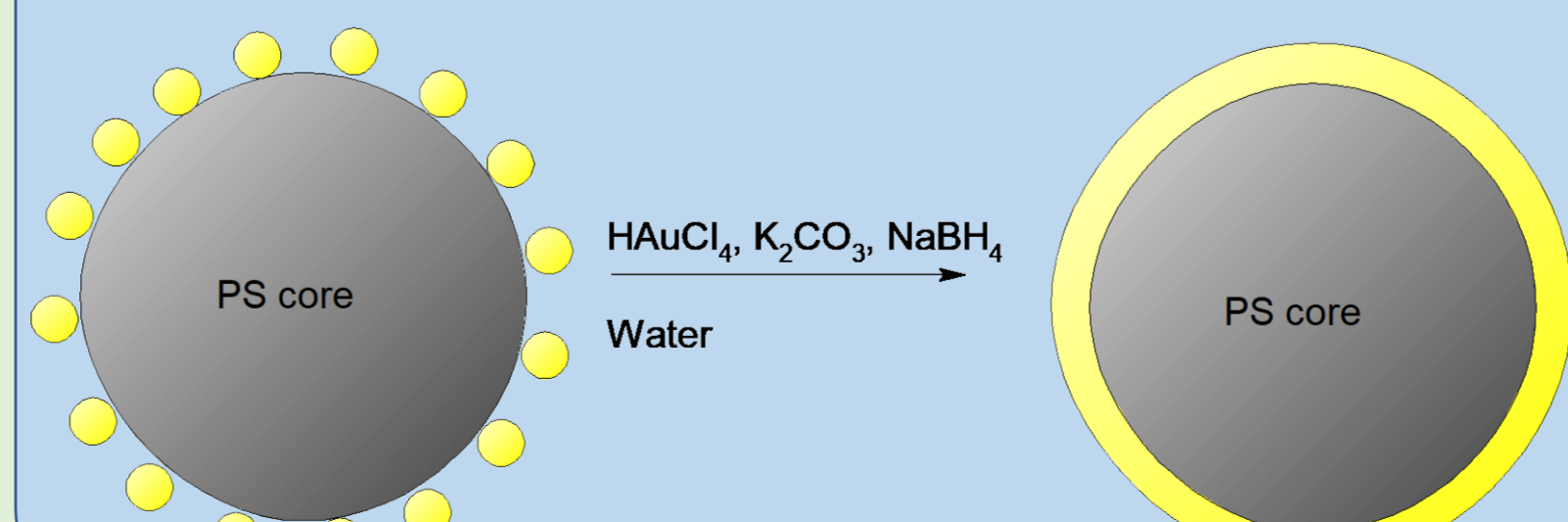
### Sol-gel reaction



### Gold seeding



### Gold plating



## Conclusions

- 100% glucose conversion calculated with NMR
- Polystyrene particles of 237 nm
- pH too high during reaction →
- Polystyrene-polyphenylsiloxane particles with multiple silica patches
- Small, uniformly distributed gold seeds on the polystyrene nanoparticles →
- Perfect starting point for gold plating
- pH too high during reaction →
- Increase in size of gold seeds

## Future outlook

- Investigation of pH
- Coating application → Investigate optical properties

## References

Walther, A *et al.* Janus Particles. *Soft Matter* **2008**, 4 (4), 663.

Mann, D *et al.* The Influence of Particle Size Distribution and Shell Imperfections on the Plasmon Resonance of Au and Ag Nanoshells. *Plasmonics* **2017**, 12 (3), 929–945.