

# Polymers as crosslinking agents in Covalent Adaptable Networks

Giulia SCURANI<sup>A\*</sup>, Niccolò BRAIDI<sup>A</sup> and Francesca PARENTI<sup>A</sup>

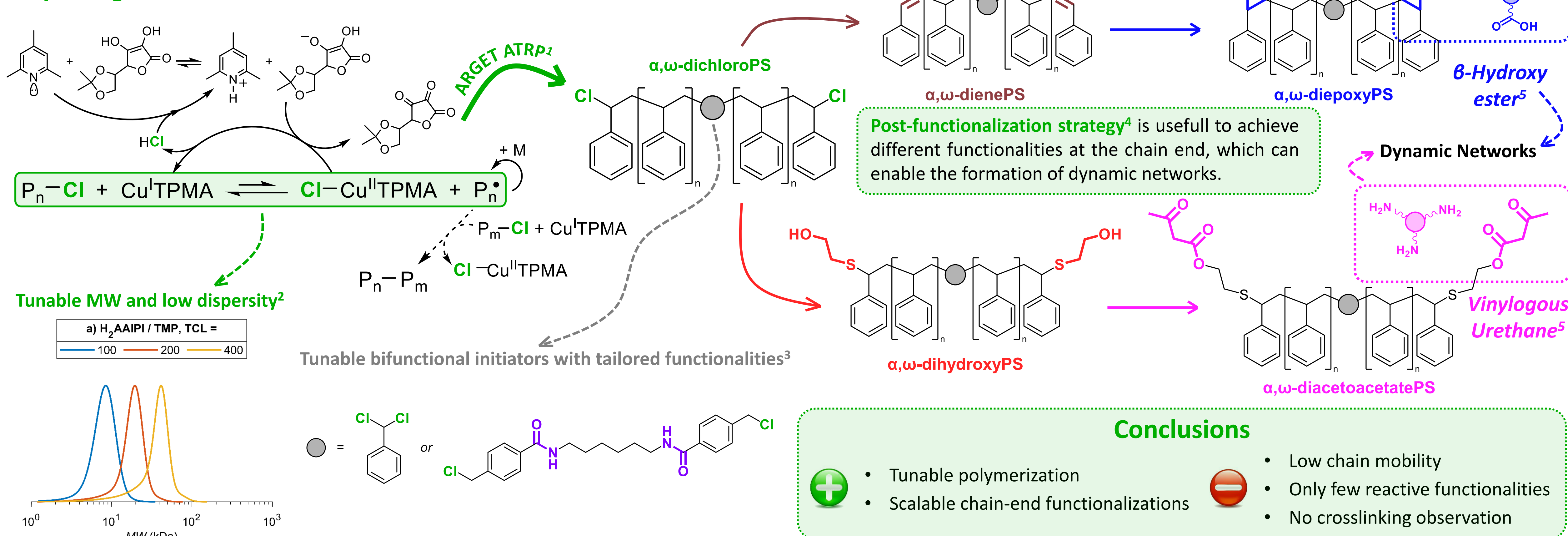
<sup>A</sup> Department of Chemical and Geological Sciences, University of Modena and Reggio Emilia, Via Campi 103, 41125, Modena, Italy

\*[giulia.scurani@unimore.it](mailto:giulia.scurani@unimore.it)

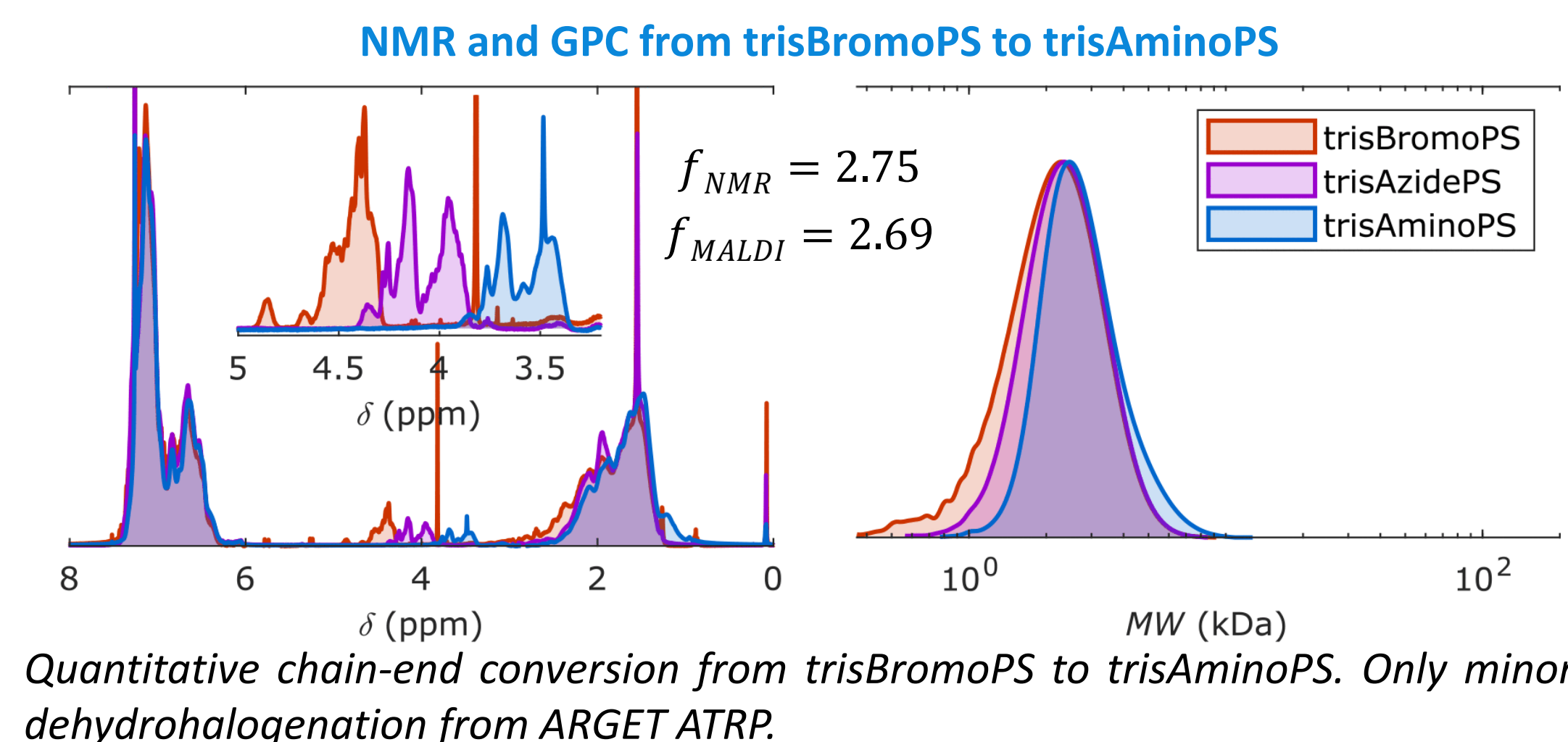
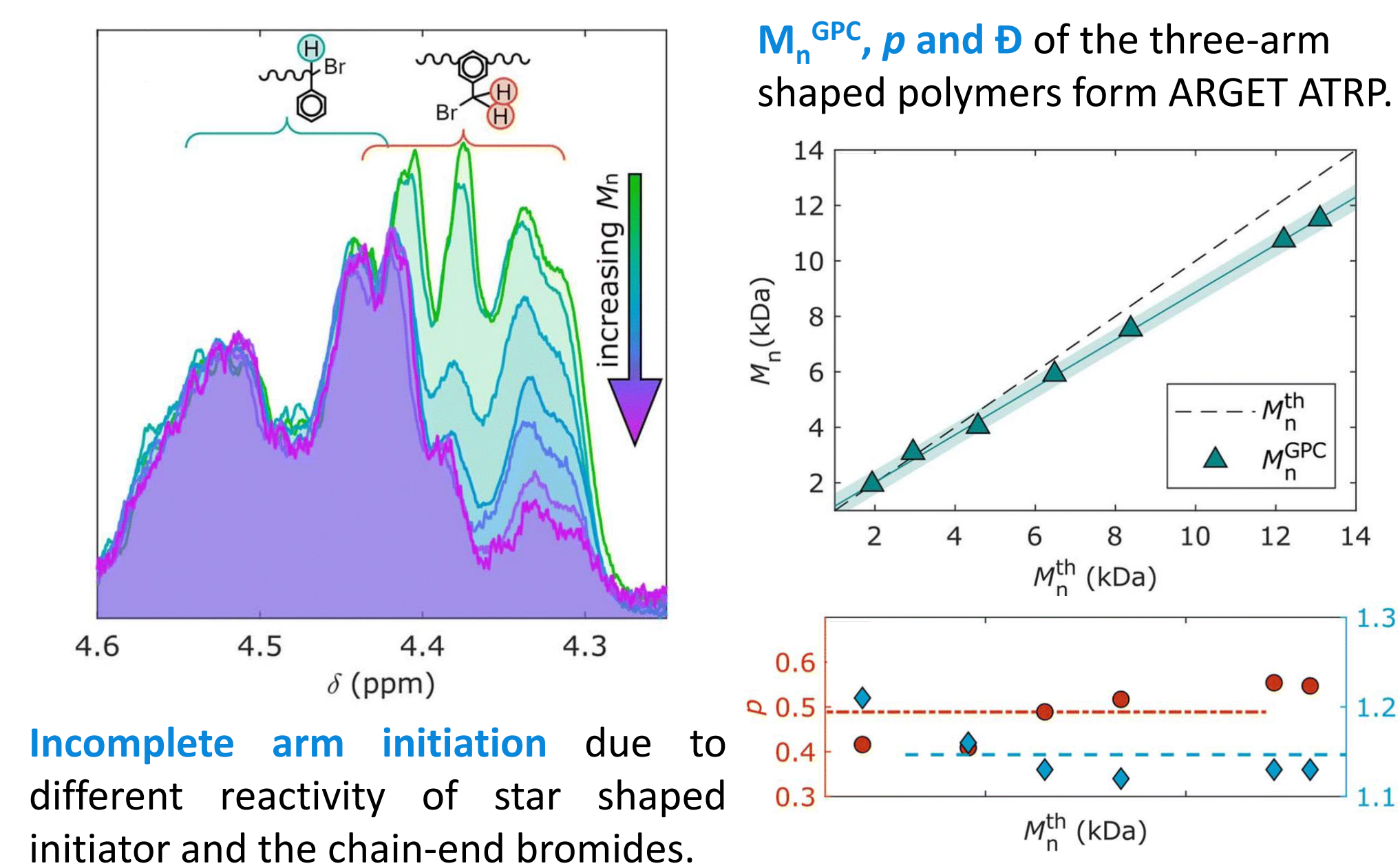
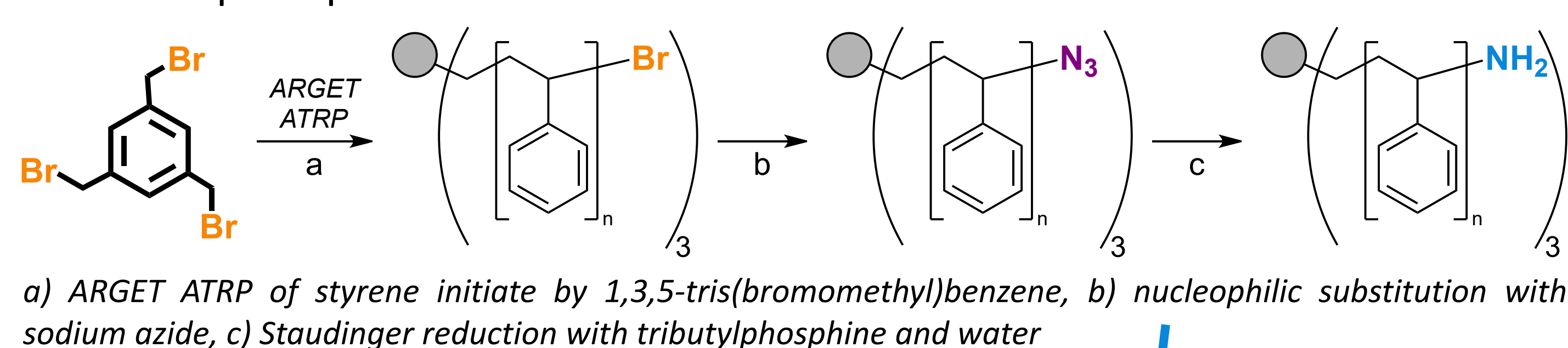
## Background

G. Scurani<sup>A</sup>, N. Braidì<sup>A</sup>, N. Porcelli<sup>A</sup>, S. Piccinini<sup>A</sup> and F. Parenti<sup>A</sup>

### Exploring different functionalities

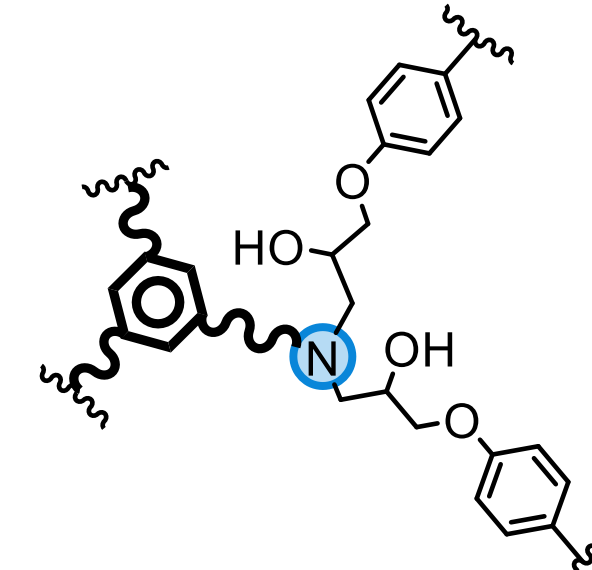


**Trifunctional initiator employed in ARGET ATRP** to obtain a star-shaped polymer and subsequent post-functionalization.



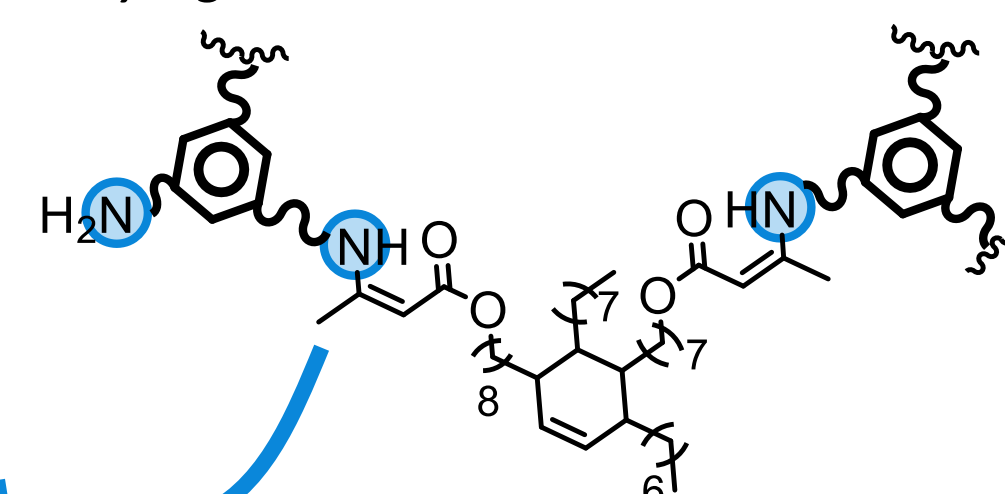
**Properties and characterizations of permanent and dynamic crosslinked materials** form Tris-AminoPS ( $M_n = 4.69$  kDa).

**Epoxy-based Thermoset**



Swelling ratio (%)	300 ± 30
Soluble fraction (%)	5.4 ± 5.3
$T_g$ (°C)	71
$T_{onset, d, air}^*$ (°C)	217

**Vinylogous Urethane Associative CAN**



Swelling ratio (%)	900 ± 50
Soluble fraction (%)	13.7 ± 3.0
$T_g$ (°C)	76
$T_{onset, d, air}^*$ (°C)	327

## Conclusions

- Ten-gram scale synthesis
- Quantitative end-group conversion
- High thermal stability
- High material rigidity
- Small extent of β-elimination reduces functionality

## References:

[1] Ghelfi, Ferrando, Longo, Buffagni WO 2019/215626 A1; [2] N. Braidì et al; *Polym. Chem.* **2023**, 14, 1567-1576; [3] Master Thesis's Giulia Scurani; [4] Master Thesis's Sofia Piccinini; [5] C. J. Kloxin,; *Macromolecules.* **2010**, 43, 2643 – 2653; [6] N. Braidì et al; *Polym. Chem.* **2025**, 16, 1546-1555.

## Aknowledgements

The authors would like to thank the <sup>B</sup>Polymer Chemistry Research Group at Gent University for fruitful collaboration.

## Fundings

Ph.D scholarship funded by National Recovery and Resilience Plan (PNRR) and Versalis SpA