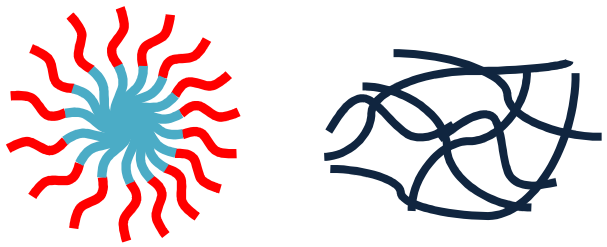
Telechelic star polymers

Consiglia

Samples: DDN

- Network 1- Self assembled TSP ($\boldsymbol{PS_{26k}PI_{27k}}$)
- Network 2- Linear PI (Mw=280K)
- Solvent - Phenyldodecane



Samples investigated:

	Concentration TSP [g/g]	Concentration PI [g/g]	Ne (PI)	Quantity
Double I	33%	6 %	5	$\sim 40mg$
Double II	33%	12 %	10	$\sim 40mg$

The dual network can be also realized considering:

- PI with different Mw
- Different TSP concentration
- Other linear polymers as second network (such as block copolymer PS-PI)

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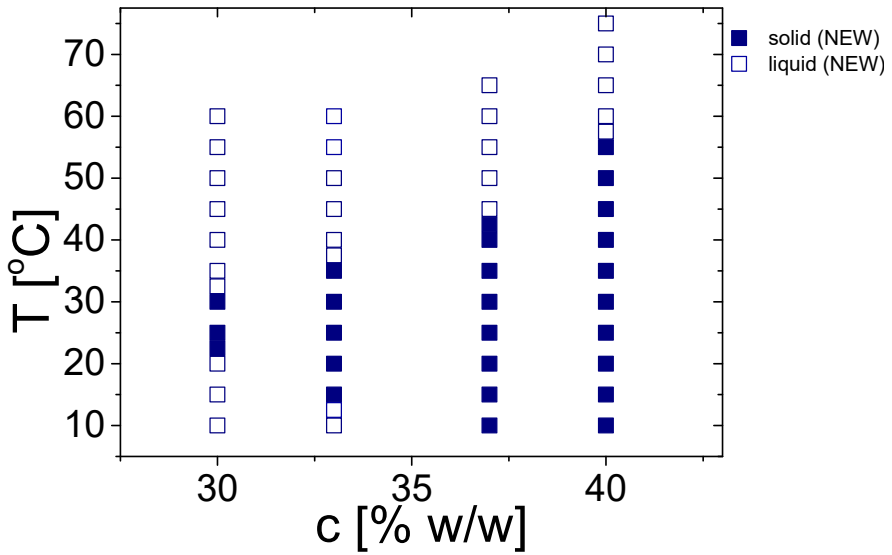
Properties studied so far:

- Rheological characterization of $PS_{26k}PI_{27k}$ (effects of T , c) and of dual network :
  - Dynamic of the systems
  - Phase diagram
  - Non linear properties



- SAXS : structure determination

Interesting to do:

- Extensional rheology:
  - Influence of the phase on TSP properties
  - Role of linear chains on the non linear behavior of the dual network (TSP+PI)

- Studying the impact of a drop?

Network with pendant groups at x-linking points

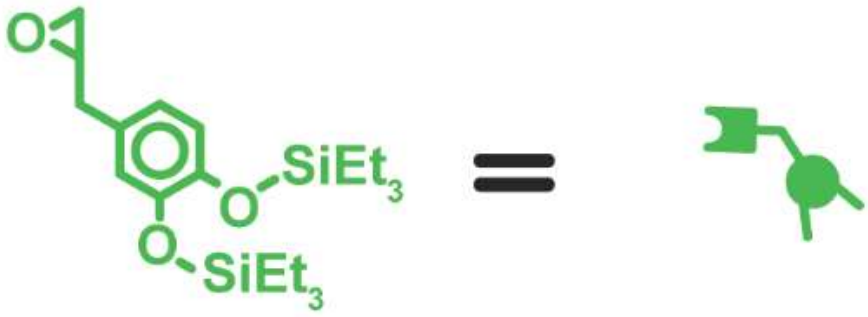
Emmanouela

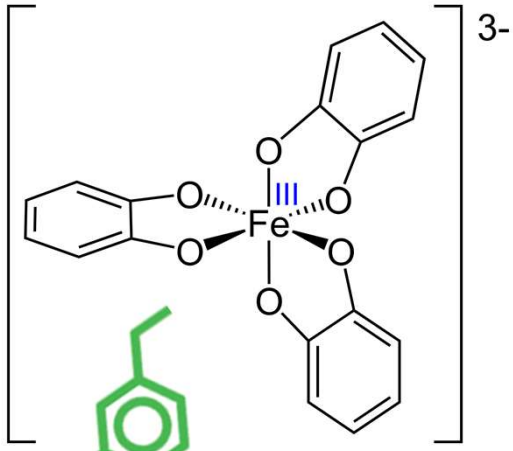
Samples:

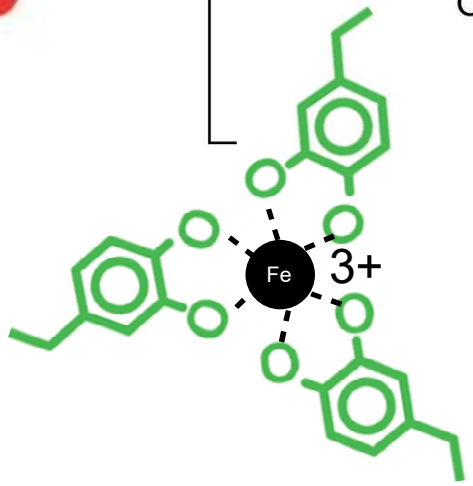
polymer: PEG diepoxide

cross-linker: diamino butane

pendant group: protected catechol epoxide







Network with pendant groups at x-linking points

Properties studied so far:

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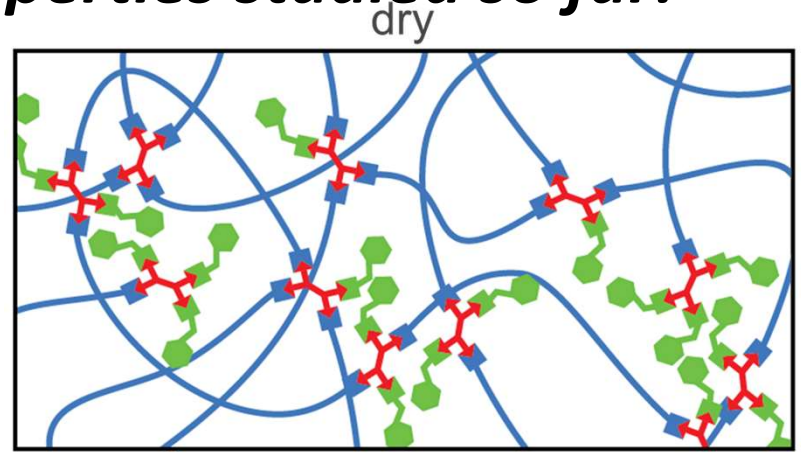
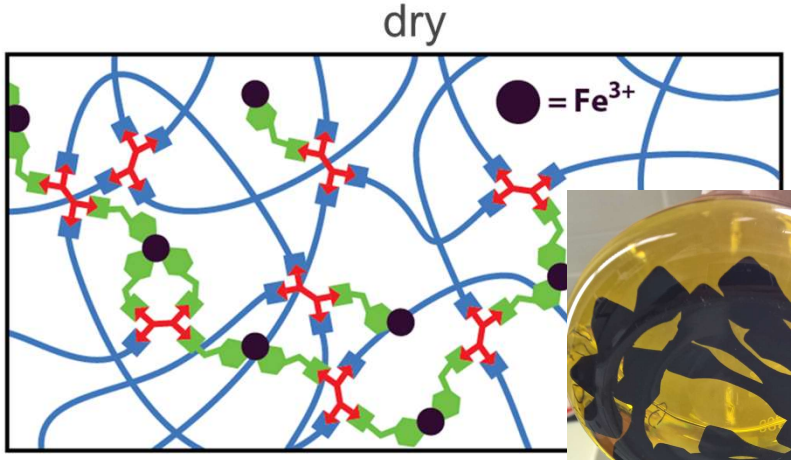
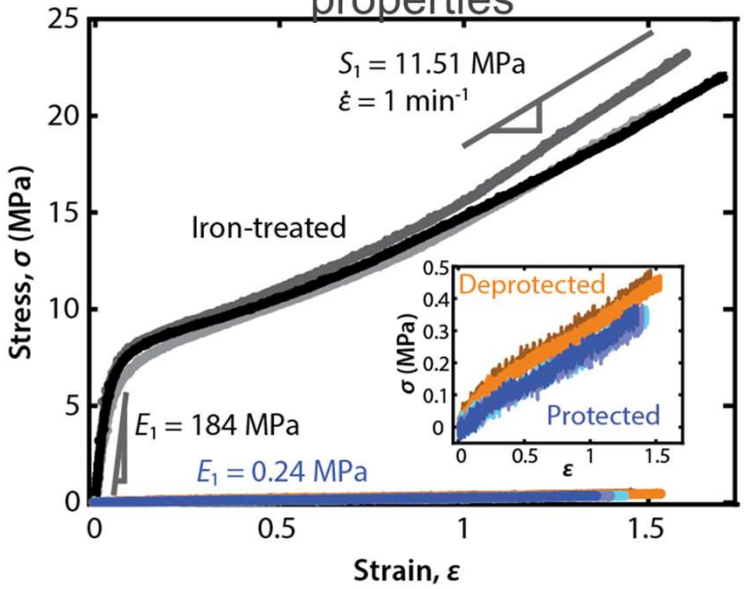


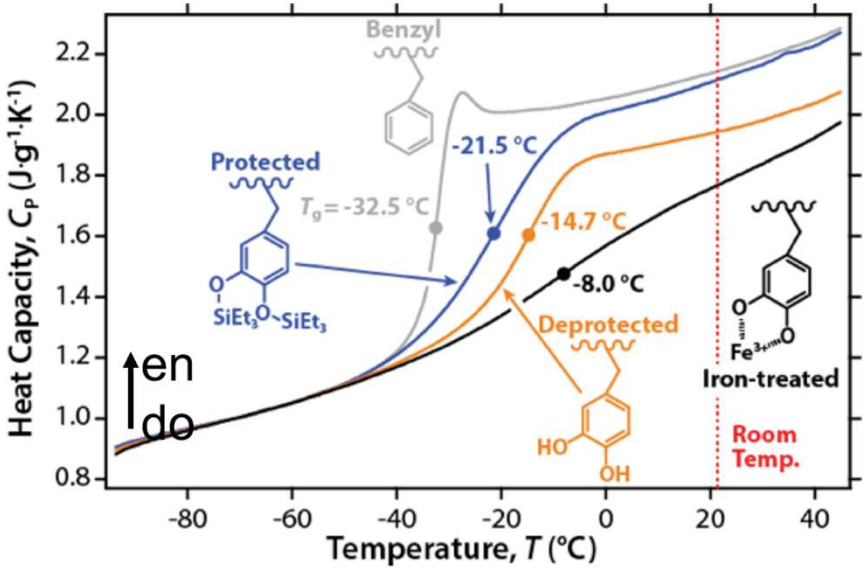


wet

Excellent mechanical properties



Broad glass transition



Network with pendant groups at x-linking points

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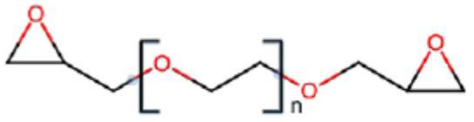
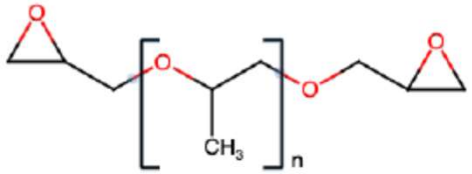
Open questions:

1. Understand the broad glass transition via dielectric spectroscopy and modulated DSC
2. Prevent loss of mechanical properties due to humidity



PEO

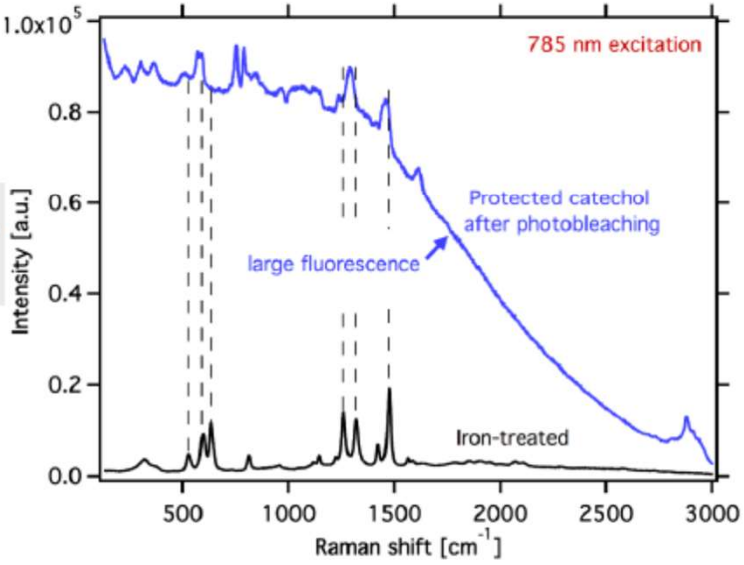


PPO

Also vary n.
Crystallization?

3. Link microscopic picture with macroscopic mechanics
   e.g. pronounced yielding ?=? chain escape from cluster
   ?=? dynamic bond breaking

e- energy loss spectroscopy (EELS) TEM	Raman: fluorescence vs resonance Raman, 785nm excitation vs 514nm excitation.

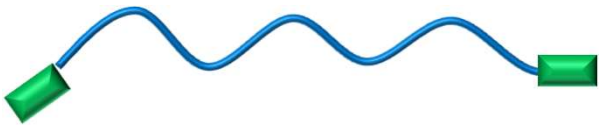


4. Remove Si-$(CH_3)_3$ protecting group "contaminant"

5. Study stress-relaxation mechanisms beyond yield point

Network ABA triblock

Samples:



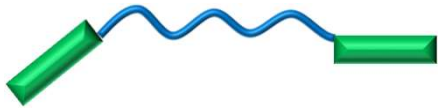
Clément

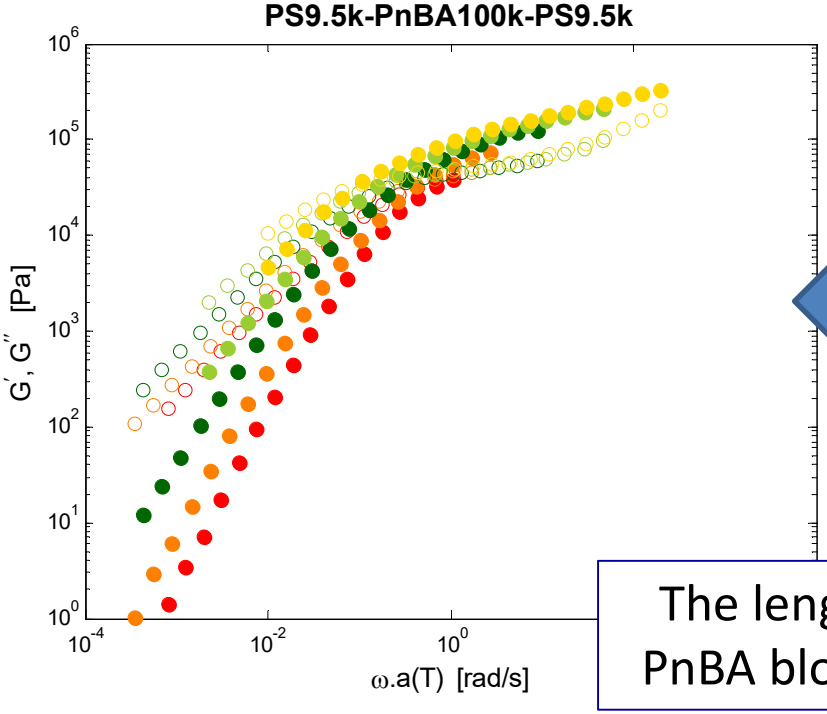
Name	Mn (kg/mol)	D	m (g)	Tg (°C)	PS total length (kg/mol)	PS content (%)
PS9,5k-co-PnBA82k-co-**PS9,5k**	100	1,48	2,5g	-45	19	16
PS9,5k-co-PnBA130k-co-PS9,5k	145	1,53	5,6g	-45	19	13
PS9,5k-co-PnBA150k-co-PS9,5k	165	1,56	3,9g	-45	19	11
PS12,5k-co-PnBA62k-co-**PS12,5k**	87	1,45	~1,6 g	~20	25	29
PS12,5k-co-PnBA35k-co-PS12,5k	60	1,45	1,5g	1:-45 2:80	25	42

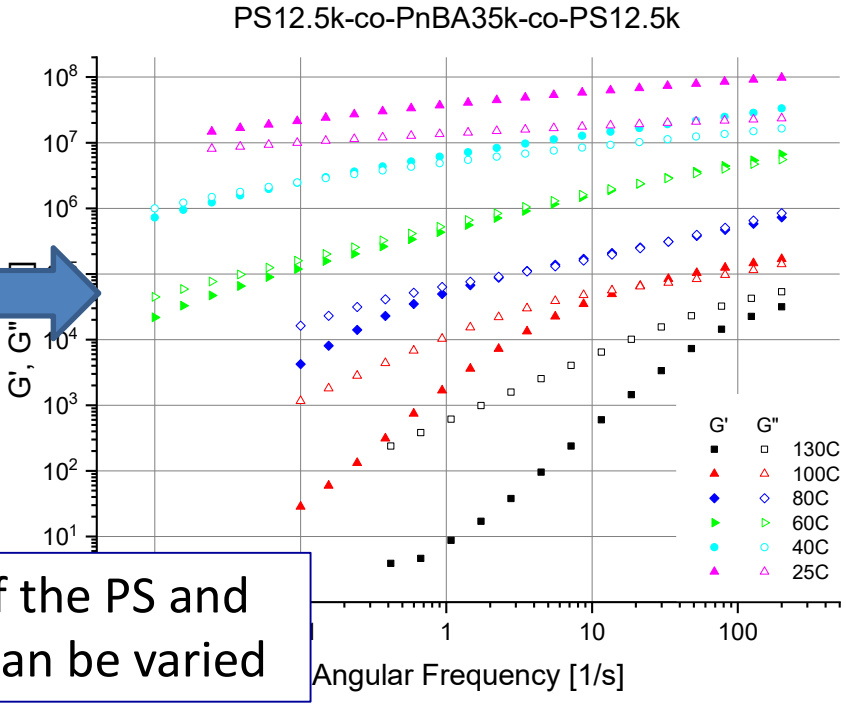
Network ABA triblock

Properties studied so far:

Clément







The length of the PS and PnBA blocks can be varied