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Thèse (ANR), 2018 – 2021
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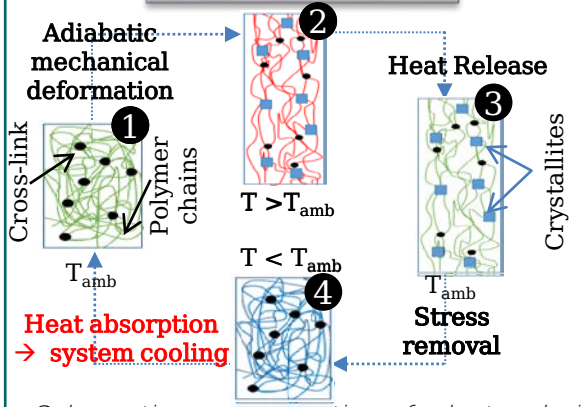
Study of the elastocaloric effect of natural rubber (NR) for the development of sustainable solid refrigeration systems

Equipe PVMH

Context



Schematic representation of elastocaloric effect in Natural rubber (NR)

Origin of elastocaloric effect

Elastic entropy + Strain induced crystallization (SIC)

Aim of the thesis

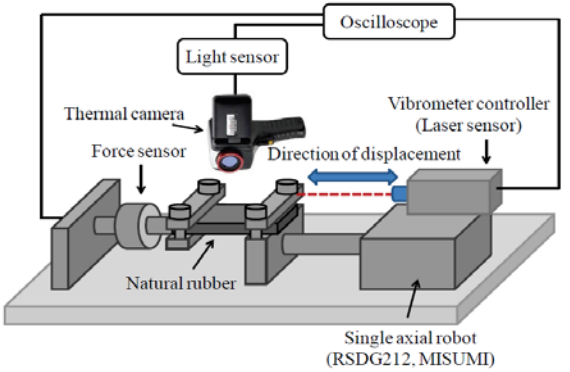
Maximizing the cooling effect

- Material properties (Cross-links density…)
- Thermo-mechanical cycle

→ Optimize SIC

Method and tools

- Characterization of samples with different thicknesses → study the effect on heat exchange
- Synchronization of mechanical and thermal measurements *



Schema of the mounting used for mechanical and thermal characterization

Other techniques :

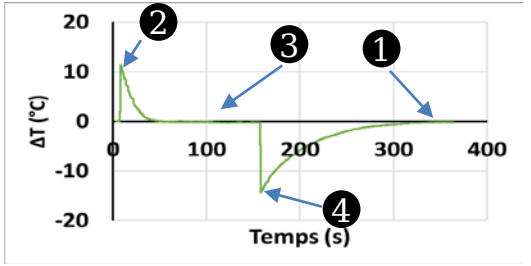
- X-ray, Optical microscopy, MEB, AFM ,,,,

→ **Link between elastocaloric effect and samples' microstructure**

* Thèse Yukihiro Yoshida

Results

- Characterization of the elastocaloric effect



- Analysis of the effect of the intrinsic materials properties and of mechanical cycling profile on temperature variation
- Highlighting of mechanical cycling profile on stress variation