INTRODUCTION

- Thermal conductivity (λ) is a material intrinsic property that estimates its ability to conduct heat. When λ is lower than 0.025 W m⁻¹ K⁻¹, materials are called super-insulators [1].
- Aerogels are gels in which the liquid was replaced with a gas. They have a very high porosity, low apparent densities and good thermal properties [2].
- The aim of this work is to prepare super-insulation aerogels from nanocellulose. Structural, mechanical, and thermal conductivity properties were studied.

THERMAL TRANSFER IN INSULATION MATERIALS

\[ \lambda_{tot} = \lambda_{gas} + \lambda_{solid} + \lambda_{rad}(Wm^{-1}K^{-1}) \] [1]

- SOLID CONDUCTION (PHONONS)
- GAS CONDUCTION (MOLECULES)
- THERMAL RADIATION (PHOTONS)

RESULTS

- We prepared nano cellulose aerogel materials with a novel method (Freeze-drying vs Super Critical drying) [5], [6], [7], [8].
- We showed that the freeze-drying parameters are controlling the aerogels structure (Films vs fibers) and their pore size.
- We have been able to obtain competitive thermal conductivity values (0.024 W m⁻¹ K⁻¹) [5], [6], [7].
- The produced aerogel material have promising mechanical properties [5], [6], [7].

CONCLUSION

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REFERENCES