

Internship subject – 2nd year of Master or End of engineering curriculum (6 months)

Development of new elastomers for additive manufacturing

Additive Manufacturing allows a complementary production approach to traditional material manufacturing. The main advantages of this technique, which is particularly suitable for small-scale production, are the reduction in manufacturing cost and time. Moreover, the increased control of the quantities of material used helps to meet economic and ecological challenges. Thus, the opening of this manufacturing method to a new category of materials, namely elastomers, is an important step in meeting these challenges.

This course is part of a CIFRE thesis which brings together the IPREM laboratory (<https://iprem.univ-pau.fr/fr/index.html>) and the EMAC company (<https://www.emac-caoutchouc.com/fr/>), allowing access to know-how in the production of elastomeric materials (EMAC) and in the characterization of polymer materials (IPREM) through the training of a PhD student.

This work can be divided into three main stages: first, the control of the rheological behavior of the materials; second, the control of the cross-linking kinetics; and finally the realization of a 3D object. The present subject is interested in the kinetics of cross-linking of different elastomer formulations using new initiators and the control of the network formed.

The tasks to be carried out will be:

- Bibliography: Research of elastomer crosslinking using several initiators
- Development of formulations
- Kinetic study of the cross-linking and optimization of the latter in the perspective of 3D printing
- Characterization of the obtained material

Keywords: Elastomers, EPDM, vulcanization, kinetics, network node density, mechanical properties.

Skills: Curiosity, seriousness, autonomy, good skills of English (reading documents/speaking)

Location : IPREM; part of the work will be carried out within EMAC (Mauléon, 64).

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