MATERIALS SCIENCE AND TECHNOLOGY

ITT Italia - Design and development of brake pads with sustainable materials

Funded By	ITT ITALIA S.R.L. [P.iva/CF:02669220044]
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Context of the research activity	The automotive sector has been addressing the issue of environmental impact and sustainability of materials and processes in the last years. In this context, the production and use of brake pads certainly have a significant impact on sustainability issues. Brake pads are products based on varied and complex formulations, and the use of more environmentally friendly materials represents a major challenge. The main focus of the research will be the design and development of formulations based on materials with a higher level of sustainability than those traditionally used at an industrial level. All the activities will be carried out in close collaboration with R&D department of ITT Italia (Barge, CN).
Objectives	The Ph.D. thesis will be developed according to the following activities. - In-depth literature and patent analysis and comparison with the typical formulation currently in use in industry - Collection and characterization of suitable raw materials and, if necessary, their chemical-physical modification - Preparation, curing and characterization of formulations at a lab-scale - Production of brake pads at pilot-scale and their technical characterization - Life cycle analysis (LCA) on the most promising formulations The Ph.D. student will attend several courses relevant for the research activity and for the development of soft skills offered by Politecnico di Torino or other. Research periods will be spent in R&D department and production site of ITT in order to develop specific knowledge of the productive processes. Research periods will be also spent in Universities and research centers abroad. Participation in national and international workshops, conferences and schools will be strongly encouraged.
Skills and competencies for the	Candidates should have a strong background in materials science and engineering and/or materials chemistry, as well as a high motivation to learn through advanced research. Expertise in chemical functionalization strategies and/or materials

for the development of the activity	characterization and/or mechanical testing and/or thermal-rheological properties characterization is appreciated. Practical attitude for the lab activities and problem-solving skills are also appreciated.