(Industrial eco-responsible project) Development of a bio-sourced epoxy resin for advanced microelectronics packaging

Record number : OPR-1083

Overview

RESEARCH DIRECTION

Serge Ecoffey, Professeur sous octroi de recherche - Department of Electrical and Computer Engineering

INFORMATION

serge.ecoffey@usherbrooke.ca

ADMINISTRATIVE UNIT(S)

Faculté de génie
Département de génie chimique et de génie biotechnologique
Département de génie électrique et de génie informatique
Institut interdisciplinaire d'innovation technologique (3IT)

LEVEL(S)

2e cycle
3e cycle
Stage postdoctoral

LOCATION(S)

3IT - Institut interdisciplinaire d'innovation technologique
C2MI - Centre de Collaboration MiQro Innovation
Kemitek

Project Description

Context:
Sustainable development is a central topic in the strategic planning of industries that guides technological advancements to use them to replace current materials and chemical substances with more environmentally friendly alternatives. Epoxy resins, commonly used as adhesives in the encapsulation of electronic components, are predominantly synthesized from petroleum-derived compounds. Bio-sourced epoxy resins are a more eco-friendly and less toxic alternative in several non-electronic applications. However, the main barriers to the use of bio-sourced epoxy resins in microelectronics are the more demanding performance criteria, which are virtually unexplored and require thorough evaluation. Moreover, the biodegradability and toxicity of these new bio-sourced materials have not been fully studied. As such, the opportunity to propose a greener and less toxic alternative to resins derived from petroleum compounds must be further explored.

The work is based on the processes and expertise of the research groups of Prof. Serge Ecoffey and Prof. David Danovitch at 3IT and C2MI in the fields of microfabrication, and the expertise of Prof. David Gendron from Kemitek in the field of polymer organic chemistry. This extensive multidisciplinary integration project aims to engage several highly qualified individuals: postdoctoral (1), doctoral (1), and master's (2) covering research areas ranging from chemistry and materials science to mechanical engineering and electrical engineering.

Work Environment:
The activities of the postdoctoral internship and the master's projects will be carried out in the facilities of 3IT in Sherbrooke and C2MI in

Bromont, while those of the doctoral project will be carried out first in the Kemitek facilities in Thetford Mines, and secondarily at C2MI.
The 3IT, Interdisciplinary Institute for Technological Innovation, is a driver and showcase for the innovative practices of university and industrial research that are socially and economically responsible. The 3IT facilitates the acceleration of technological transfers with companies and public and private organizations, particularly in the health, information and communication, transport, and energy sectors.
The C2MI, Center for Collaboration and MiQro Innovation, is one of the largest R&D centers in electronic systems in Canada and has infrastructure and several laboratories for the microfabrication of microelectronic systems on an industrial scale. This is complemented by the expertise and skills to develop and commercialize electronic systems and innovative prototypes essential to the digital revolution. The student will thus benefit from an exceptional research environment that combines students, professionals, professors, and industrialists working hand in hand to develop the technologies of the future.
Kemitek is a Collegial Center for Technology Transfer (CCTT) and a Canadian Technology Access Center (CAT). Their expertise encompasses green chemistry, organic synthesis, formulation, the development of chemical products and processes, as well as process scaling. They work closely with companies to help them develop more environmentally friendly industrial products.

Profiles Sought:
• Specialization in materials engineering, chemical engineering, physics, or electrical engineering
• Assets: knowledge in microelectronics, packaging and microfabrication
• Strong adaptability, autonomy, and problem-solving skills
• A pronounced taste for design, experimental work, teamwork, and R&D
• Fluent in French and/or English

Discipline(s) by sector

Sciences naturelles et génie

Génie chimique, Génie électrique et génie électronique

Funding offered

Yes

Partner(s)

C2MI