

Scholarship Application Template

PhD SCHOLARSHIP APPLICATION DATA

Business Division	Energy and Environment
Business Area	Materials
Scholarship location	Miñano/Vitoria
Province/Building	Alava/Miñano 2

SCHOLARSHIP DESCRIPTION

Title: High performance isocyanate-free bio-polyurethanes (Bio-NIPUs) based on used vegetable cooking oil.

Brief description of scholarship:

Development and preparation of high performance isocyanate-free polyurethanes and with similar properties to target commercial polyurethanes, based on used cooking oil and CO₂. To do so, a family of cyclic organic carbonates will be prepared and characterised derived from used vegetable oil whose reaction with diamines and other additives will produce the Bio-NIPUs.

Scholarship description:

The main objective of the project will be to prepare high performance isocyanate-free bio-polyurethanes (Bio-NIPUs) using two products that are worrying for sustainability and the environment as raw materials, namely used vegetable cooking oil and carbon dioxide. The project consists of four differentiated phases: 1) Selection of vegetable oil; 2) Epoxidation of used vegetable oils via traditional methods; 3) Preparation of cyclic organic carbonates through the reaction of epoxides derived from vegetable oils with carbon dioxide. To do so, low cost metallic catalysts and/or functionalised ionic liquids that facilitate the selective and efficient formation of cyclic carbonates will be developed; 4) Synthesis of isocyanate-free bio-polyurethanes with different properties and features similar to the target commercial polyurethanes through the reaction of the cyclic organic carbonates derived from the vegetable oils with different diamines.

The Thesis will be developed within the University of the Basque Country's (UPV/EHU) "Applied Chemistry and Polymeric Materials" Doctorate Programme. Although other programmes may be valued.

Candidate requirements:

- Degree/specialisation: Graduate in Chemical / Organic or Inorganic Sciences holding a Master's Degree that allows access to the PhD scholarship programme prior to incorporation in the scholarship.
- Languages: Command of written and spoken English is essential.

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- IT skills: Command of office automation, particularly Excel Spreadsheets.

The following will be a plus:

- Good academic record.
- Knowledge of catalysis, organometallic chemistry and chemical synthesis.
- Knowledge of analytical and characterisation techniques. HPLC, GC, FTIR, NMR, TGA.
- Experience in laboratory work.
- Initiative to put forward theoretical concepts, and their experimental development.
- Teamworking skills
- Publications and participation in scientific conferences.

Further information and applications: <http://bit.ly/2HI4W8o>