IITB-Monash Research Academy

Indian Institute of Technology Bombay | MONASH University

An Indian-Australian research partnership

Project Title:	**Selective conversion of biomass derived terpenes into flavour and fragrances products**	
Project Number	**IMURA0892**	
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IITB Department:	Chemistry	

Research Clusters:

Highlight which of the Academy's CLUSTERS this project will address? *(Please nominate JUST **one.** For more information, see www.iitbmonash.org)*	
1	
2	***Energy, Green Chem, Chemistry, Catalysis, Reaction Eng***
3	
4	
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Research Themes:

Highlight which of the Academy's Theme(s) this project will address? *(Feel free to nominate more than one. For more information, see www.iitbmonash.org)*	
1	
2	
3	*Clean Energy*
4	
5	
6	
7	
8	

The research problem

Define the problem

Biomass derived terpenes are invaluable precursor to flavour and fragrance compounds which are increasing in demand worldwide. However, the process for converting these precursors suffers from poor selectivity towards desirable products. This project will aim to synthesise novel catalysts with desirable structural, physical, and chemical properties to achieve selective conversion of terpenes into product molecules of interest. While most of the catalysts studied so far are heterogenous or homogeneous chemical catalysts, there are number of enzymatic and microbial conversion of terpenes reported in literature. While the former method provides high rate of conversion it suffers from selectivity, whereas the latter method provides higher selectivity at lower rate. Therefore, there is a need to develop a bio-mimetic catalyst which has the potential to enhance selectivity.

Project aims

Define the aims of the project

1. Identify the catalytic domains of industrially relevant catalysts responsible for the synthesis of desired and undesired products
2. Develop a method for catalyst synthesis which provides high density of the domains responsible for desired products while minimising the domains responsible for undesirable reactions.
3. Select the best catalyst for process intensification studies in a continuous flow reactor.

Expected outcomes

Highlight the expected outcomes of the project including likelihood of patents

This project is expected to deliver bio-mimetic optimised catalyst and an industrially relevant process, both of which have the potential to generate novel IP.

How will the project address the Goals of the above Themes?

Describe how the project will address the goals of one or more of the 6 Themes listed above.

Catalysis and green chemistry approaches will be used for the development of process and the chemical

products targeted in this project are potential fuel precursors.

Capabilities and Degrees Required

List the ideal set of capabilities that a student should have for this project. Be as specific or as general as you like. These capabilities will be input into the online application form and students who opt for this project will be required to show that they can demonstrate these capabilities.

Chemical / Materials Engineering background is essential.
Research experience in catalyst synthesis, characterisation or testing is desirable.
Experience with analytical methods for organic chemicals (GC/ HPLC) is also desirable.

Potential Collaborators

Please visit the IITB website www.iitb.ac.in OR Monash Website www.monash.edu to highlight some potential collaborators that would be best suited for the area of research you are intending to float.

Select up to **(4)** keywords from the Academy's approved keyword list **(available at http://www.iitbmonash.org/becoming-a-research-supervisor/)** relating to this project to make it easier for the students to apply.

Novel Functional Materials
Waste to Wealth
Catalysis and Reaction Engineering
Green Chemistry
Smart Manufacturing