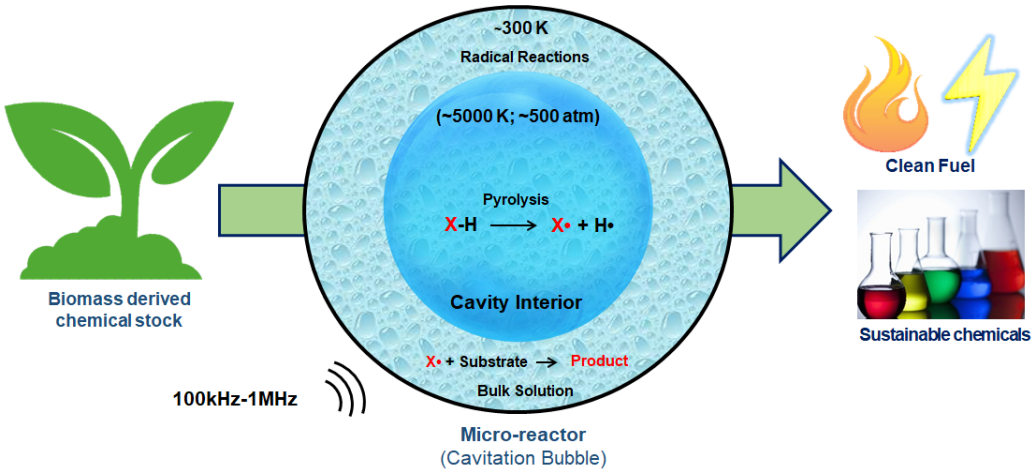
Cavitation bubble as microreactor: performing chemistry in a bubble

Prince Nana AMANIAMPONG

Institute of Chemistry of Environments and Materials of Poitiers, University of Poitiers, Poitiers, FRANCE
prince.nana.amaniampong@univ-poitiers.fr

The use of unconventional activation techniques, such as low and high frequency ultrasound (US), in combination with heterogeneous catalysts offers a powerful synergistic approach to transform renewable resources to value added chemicals. Taking advantage of the cavitation bubbles generated during ultrasound irradiation which often acts as a micro-reactor and the localized extreme conditions of temperature and pressure, small molecules can be activated to yield highly reactive radicals that can in synergy with catalysis promote the selective conversion bio-based substrates into valuable products which are hitherto difficult to obtained under conventional routes and at mild reaction conditions. Through selected examples, we demonstrate the potential of high frequency ultrasound working in concert with catalysis in promoting the formation of relevant industrially valuable chemicals.



Cavitation bubble as microreactor: performing chemistry in a bubble

Prince Nana AMANIAMPONG

Institute of Chemistry of Environments and Materials of Poitiers, University of Poitiers, Poitiers, FRANCE
prince.nana.amaniampong@univ-poitiers.fr

BIO

Prince Nana Amaniampong is a CNRS Researcher at the Institute of Chemistry of Environments and Materials of Poitiers (IC2MP, University of Poitiers).
After his master's degree in Energy Technology and Environment, he joined the Nanyang Technological University Singapore, where he received his doctorate in heterogeneous oxidation catalysis in 2016. His PhD work focused on the development of supported gold nanoparticle catalysts for selective bio-based oxidation reactions. He then carried out a post-doctorate in the group of G. Chatel and then Francois Jérome at the Institute of Chemistry of Environments and Materials of Poitiers, University of Poitiers France (2016-2019), where he developed the application of sonochemistry and sonocatalysis using high frequency ultrasound technologies in the selective transformation of bio-based substrates into industrially relevant chemicals.
Appointed as a CNRS Researcher in 2019, he has been actively involved in the development of sonochemistry as an alternative activation tools in assisting catalytic reactions that are generally considered sluggish and challenging.
In 2021, he was appointed as an editorial board member of Ultrasonics Sonochemistry journal, Molecular Catalysis, ChemPlusChem and a Topical Advisory board member of the journal Catalysts (IF: 4.146) and is an author of over 30 peer-reviewed articles (, 7 book chapters, 1 patent, which have given rise to more than 1000 citations (h index = 21).
In 2024, he was awarded the prestigious CNRS Bronze Medal for his work on Sonochemistry and Sonocatalysis. Prince also received the coveted ERC Starting Grant in 2023, on a project that focuses on the control of cavitation bubbles for the activation of small molecules. In 2022, he received the French Chemical Society Young Researcher Award for the Catalysis Division (DivCat).
He is part of the IC2MP (France) - SOLVAY (E2P2L Shanghai) research and industrial partnership consortium that aims at innovating and taking research breakthroughs from the lab-bench to industrial commercialization.