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Zero emission from industrial waste water using green solvent: Experiment and quantum chemical calculations

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Growing concern about environmental issues has prompted the pickling industries, paper and pulp industries, dyestuff industries, tanning and textile industries to investigate environmentally benign, energy saving and effective methods. Industrial waste water containing several color compounds causes serious environmental problems. The present conventional method is highly effective for the removal of specific group of compounds. However, challenging task arises with elimination of all kind of color and non-color compounds from industrial waste water at atmospheric conditions. Aiming at the replacement of the present inefficient and expensive process, ionic liquid have been considered as green and potential solvent to be used in extraction procedures. In this context, a quantum chemical calculation provides on the structural relationship, sigma profile, chemical potential, activity coefficient at infinite dilutions in order to find the ability and feasibility of green solvent for the selective extraction of highly environmental and water pollutant at atom and molecular level. Using this quantum chemical method, liquid-liquid equilibrium (LLE) and solid liquid equilibrium (SLE) data can be generated in order to find the amount of solvent required, number of equilibrium stage needed for complete removal and optimum operating conditions for effective separation in the real plant at atmospheric conditions. In addition, this predicted data can be validated with experimental data. Moreover, the quantum chemical calculation is powerful tool for a prior model prediction and it can be reduced an experimental cost and time for the sustainable development in the chemical industries in order to improve the quality of water and welfare.

Biography

Anantharaj Ramalingam has completed his PhD with 18 publications from Indian Institute of Technology Guwahati, India. He had received ProSPER.Net-Scopus Young Scientist Award 2013 for Sustainable Development in Transport Category (Promotion of Sustainability in Postgraduate and Research) from Elsevier and Therman-ASSET Awards 2013 for best PhD Thesis, (Medal with INR 15000/-) from Bhabha Atomic Research Centre (BARC), India. At present, he is working as a Senior Lecturer in University of Malaya since October 2012, Malaysia.

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