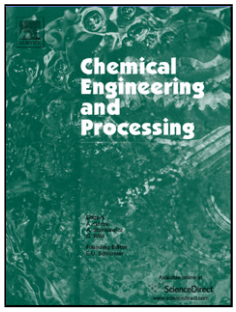

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GREENING THE GREEN ETHYLENE WITH MICROWAVES

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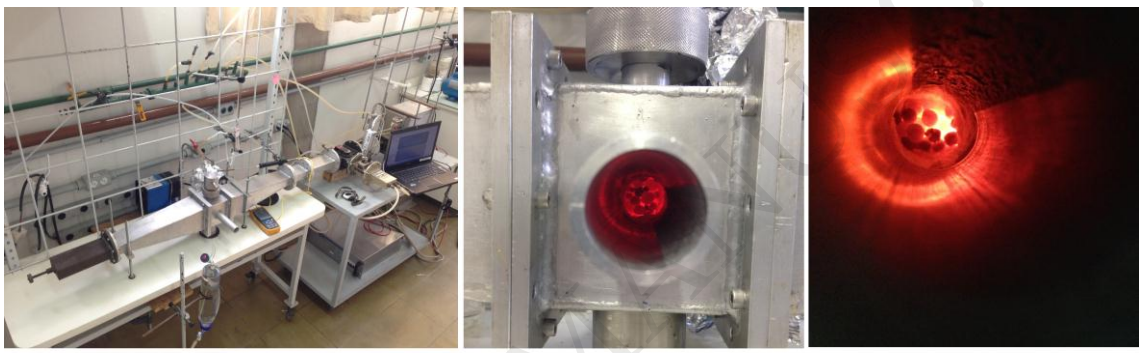
Graphical abstract



Ethanol dehydration under microwave energy to produce green ethylene.

Highlights:

- Catalytic bed sensitive to microwave heating for green ethylene production.
- Optimization of green ethylene production by microwave enhanced ethanol dehydration.
- Voiding of carbon dioxide generation in ethanol dehydration.

Abstract: This paper presents a study to develop a microwave irradiated fixed bed flow reactor for high temperature operations. One innovation introduced is the concept of catalytic bed sensitive to microwave heating which catalyzes the reaction and heats only the reaction site. Another innovation is on the cavity design, which is of a non-standard shape, which is a result from computational electromagnetic modelling. The focus of this work is on green ethylene production from ethanol dehydration. This reaction is conducted at high temperature and over a solid catalyst. Results showed a yield of 60.8% for green ethylene. This figure is of the same order than the ethylene conventional process, with the advantage that no carbon dioxide emission exists in the whole process. This concept may be thought of as a consequence of Microwave Chemistry evolution,