

Simulation and Optimization Studies of a Novel Process for the Conversion of Raffinate Butanes to Propylene

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Raffinate butenes are usually a lower value product resulting either from steam cracking units designed to produce olefins or FCC units which target gasoline production. It is always preferred to increase the useful olefin content (ethylene and propylene) while reducing C4 raffinates.

Metathesis has been traditionally used to convert butenes to propylene, by reacting the butenes with an equimolar amount of ethylene. However, there may be scenarios where ethylene is not available, or not cost effective to be converted to propylene. This also results in the lower of the ethylene yields in a cracker or FCC complex which is not always a desirable outcome. The current work on a novel process to convert butenes to propylene without the use of ethylene as a feed stream while minimizing side products.

Process has been simulated for various process configurations to maximize yield and evaluate process economics for a multiplicity of operating conditions. Results also include a planning study showing the comparative increase in olefin yield effect when integrating the new process with a typical petrochemical complex.