CLAIMS

1. A process for dimerizing and oligomerizing a mixed olefins feed comprising mixed olefins to produce mixed higher olefins, said process comprising the steps of:

introducing the mixed olefins feed into a reactor vessel under oligomerization conditions, wherein the mixed olefins feed comprises at least two butene isomers;

contacting the mixed olefins feed with an ion-exchange resin based catalyst within the reactor vessel to convert the mixed olefins into the mixed higher olefins; and

producing a product stream comprising the mixed higher olefins from the reactor vessel;

wherein the process is a single stage, single pass process and the mixed higher olefins comprises: (1) olefins having 8 carbons and (2) olefins having more than 8 carbons; and

wherein single pass conversion rates for the at least two butene isomers are greater than 50%.

2. The process of claim 1, wherein the mixed olefins feed comprises 1-butene, trans-2-butene, cis-2-butene, and iso-butene.
3. The process of claim 1, where the ion-exchange resin based catalyst comprises a sulfonic acid cation exchanger in the hydrogen form.
4. The process of claim 1, wherein the mixed higher olefins comprises diisobutene (DIB).