EPOXIDATION PROCESSES

FIELD OF THE INVENTION

[0001] Provided herein are rhenium-promoted epoxidation catalysts as well as methods for making the catalysts and for their use in the production of other end-use products.

BACKGROUND

[0002] Many facets of the practice of chemistry and/or chemical engineering can be reliant upon providing structures or surfaces capable of performing or facilitating separations or reactions and/or providing areas for such separations or reactions to take place. Such structures or surfaces are thus ubiquitous in many R&D and manufacturing settings. Although the desired physical and chemical properties of these shaped bodies can, and will, vary depending on the particular application, there are certain properties that are generally desirable in such shaped bodies regardless of the final application in which they will be utilized.

[0003] For example, such shaped bodies will desirably be of high purity and substantially inert so that the shaped bodies themselves will not participate in the separations or reactions taking place around, on or through them in a way that is undesired, unintended, or detrimental. For those shaped bodies for which it is desired to have the components being reacted or separated pass through, or diffuse into, the shaped body, a low diffusion resistance would be advantageous. For those shaped bodies desirably utilized as reaction surfaces or catalyst supports, high surface area can be desired, to improve the loading and dispersion of the desired reactants and/or catalytic species, and also to provide enhanced surface area on which the reactions or separations can take place.

[0004] Oftentimes, the desired properties of such shaped bodies can conflict with one another, and as a result, preparing shaped bodies where each desired property

2. The process of claim 1, carried out in the gas phase.

3. The process of claim 2, conducted at a temperature of from 200°C to 300°C.

4. The process of claim 2 or 3, conducted at a pressure of from ambient to 3.0 MPa.

5. The process of claim 1, further comprising converting the ethylene oxide produced into a 1,2-diol, 1,2-diol ether, a 1,2-carbonate, or alkanolamine.

6. The process of claim 5, wherein the conversion comprises reacting the ethylene oxide with water and/or alcohol to produce one or more 1,2-diols or 1,2-diol ethers.

7. The process of claim 6, wherein reaction of ethylene oxide and water is conducted in the presence of an acidic catalyst comprising 0.5 wt% to 1.0 wt% sulfuric acid.

8. The process of 6 or 7, wherein the process is conducted in the liquid phase at a temperature of from 50°C to 70°C.

9. The process of claim 6 or 7, wherein the process is conducted in the gas phase at a temperature of from 130°C to 240°C.

10. The process of claim 5, wherein the conversion comprises reacting the ethylene oxide with ammonia to produce one or more alkanolamines.

11. The process of claim 10, wherein anhydrous ammonia is used and a monoalkanolamine is produced.

12. The process of claim 5, wherein the conversion comprises reacting the ethylene oxide with carbon dioxide to provide a 1,2-carbonate.