ethylene oxide production. Activation processes can take place both before and after starting ethylene oxide production. However, as used herein, the term "conditioning" refers to processes occurring either before or after start-up. The duration and conditions of the catalyst bed during the conditioning or activation period, such as feed gas composition, feed gas flow rate, space velocity, temperature, and pressure can influence the catalyst performance that is observed after stable operation is reached. Thus, a need has arisen for conditioning and activation processes that provide improved performance after start-up.

SUMMARY

[0011] A process for conditioning a high efficiency silver catalyst used to manufacture ethylene oxide by reacting ethylene, oxygen, and at least one organic chloride over the catalyst is provided. The conditioning process comprises the steps of introducing a feed gas to the high efficiency silver catalyst at one or more conditioning temperatures ranging from 150°C to 180°C for a selected period of time. The selected period of time is at least 4 hours, and the feed gas comprises at least one component selected from the group consisting of ethylene, oxygen, methane, and nitrogen. During the introducing step, the catalyst is not simultaneously exposed to both ethylene and oxygen, thereby ensuring that the reaction between ethylene and oxygen will not take place during the selected period of time. A process for manufacturing ethylene oxide by reacting ethylene, oxygen, and at least one organic chloride over a high-efficiency silver catalyst is also provided which comprises performing the foregoing conditioning process and introducing a second feed gas to the high efficiency silver catalyst, wherein the second feed gas comprises ethylene, oxygen, and the at least one organic chloride, and the ethylene and the oxygen react to form the ethylene oxide.

[0011a] In a first aspect, there is provided a process for conditioning a high efficiency silver catalyst used to manufacture ethylene oxide by reacting ethylene, oxygen, and at least one organic chloride over the catalyst, the conditioning process comprising the steps of: introducing a feed gas to the high efficiency silver catalyst at one or more conditioning temperatures ranging from 150°C to 180°C for a selected period of time, wherein the selected period of time is at least 4 hours, and the feed gas comprises at least one component selected from the group consisting of ethylene, methane, and nitrogen, and the introducing step occurs such that the catalyst is not simultaneously exposed to ethylene and oxygen during the selected period of time.

[0011b] In a second aspect, there is provided a process for manufacturing ethylene oxide by reacting ethylene, oxygen, and at least one organic chloride over a high-efficiency silver catalyst to yield a product comprising ethylene oxide, the process comprising: performing the process for conditioning a high efficiency catalyst as defined herein, wherein the feed gas is a first feed gas; and introducing a second feed gas to the high efficiency silver catalyst, wherein the second feed gas comprises ethylene, oxygen, and the at least one organic chloride, and the ethylene and the oxygen react to form the ethylene oxide.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] Referring now to the drawings, illustrative embodiments are shown in detail. Although the drawings represent some embodiments, the drawings are not necessarily to scale and certain features may be exaggerated, removed, or partially sectioned to better illustrate and explain the present invention. Further, the embodiments set forth herein are exemplary and are not intended to be exhaustive or otherwise limit or restrict the claims to the precise forms and configurations shown in the drawings and disclosed in the following detailed description.

8. The process for conditioning a high-efficiency silver catalyst of claim 1, wherein the high-efficiency silver catalyst is aged an amount no greater than 1.1 kt ethylene oxide/cubic meter of the high-efficiency silver catalyst.

9. A process for manufacturing ethylene oxide by reacting ethylene, oxygen, and at least one organic chloride over a high-efficiency silver catalyst to yield a product comprising ethylene oxide, the process comprising:

performing the process for conditioning a high efficiency catalyst of claim 1, wherein the feed gas is a first feed gas; and

introducing a second feed gas to the high efficiency silver catalyst, wherein the second feed gas comprises ethylene, oxygen, and the at least one organic chloride, and the ethylene and the oxygen react to form the ethylene oxide.

10. The process for manufacturing ethylene oxide of claim 9, wherein the second feed gas is introduced to the high efficiency silver catalyst at a reaction temperature of no less than 210°C.

11. The process for manufacturing ethylene oxide of claim 9, wherein the step of introducing the first feed gas to the high efficiency silver catalyst follows a reactor shutdown.

12. The process manufacturing ethylene oxide of claim 9, wherein the step of introducing the first feed gas to the high efficiency silver catalyst follows the occurrence of reactor trip condition.

13. The process for manufacturing ethylene oxide of claim 9, wherein the step of introducing the second feed gas to the high efficiency silver catalyst is performed before the step of introducing the first feed gas to the high efficiency silver catalyst.

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14. The process for manufacturing ethylene oxide of claim 9, wherein the step of introducing the second feed gas to the high efficiency silver catalyst is performed after the step of introducing the first feed gas to the high efficiency silver catalyst.

15. The process for manufacturing ethylene oxide of claim 9, wherein the step of introducing a second feed gas to the high efficiency silver catalyst comprises introducing the second feed gas at a reaction temperature ranging from 220°C to 280°C, ethylene is present in an amount ranging from 15 mole percent to 35 mole percent of the second feed gas, and oxygen is present in an amount ranging from 5 mole percent to 10 mole percent of the second feed gas.

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