In addition, rhenium-promoted high efficiency catalysts have exhibited significant activity increases with increases in the gas phase promoter concentration in the feed, i.e., with increasing gas phase promoter concentration in the feed, temperature has to be decreased or the production rate will increase.

[0011] To address the strong influence of reaction temperature and gas phase promoter concentration on the efficiency of high efficiency catalysts, it has been proposed to use the temperature differential to first calculate the new gas phase promoter concentration. The gas phase promoter concentration changes are made whenever the reaction temperature is changed (U.S. Patent No. 7,193,094; European Patent No. 1,458,699). However, this technique increases the complexity of the process and the controls that are required for automated operation. It can also result in excessive or insufficient gas phase promoter consumption and increase the sensitivity of the process to disturbances in reaction temperature. It also requires knowledge of a mathematical relationship between temperature and efficiency, which may be difficult or costly to obtain. Finally, the method is intended to maximize efficiency regardless of the alkylene oxide production rate. In many cases, it is desirable to operate the process at a specified alkylene oxide production rate, for example, in order to minimize feed rate disturbances to downstream units (e.g., alkylene glycol production units). Thus, a need has arisen for a process that addresses the foregoing issues.

SUMMARY

[0012] A process for manufacturing an alkylene oxide by reacting a feed gas comprising alkylene, oxygen, and at least one organic chloride over a high efficiency silver catalyst is provided. In an aspect, there is provided a process for manufacturing an alkylene oxide by reacting a feed gas comprising an alkylene, oxygen, and at least one organic chloride over a high efficiency silver catalyst to yield a reaction product comprising the alkylene oxide, the process comprising: operating the process at an initial overall catalyst chloriding effectiveness value and an initial reaction temperature to yield an initial value of an alkylene oxide production parameter selected from the group consisting of alkylene oxide concentration, alkylene oxide yield, alkylene oxide production rate, alkylene oxide production rate/catalyst volume, alkylene conversion, and oxygen conversion; selecting a

desired value of the alkylene oxide production parameter; and adjusting one selected from the overall catalyst chloriding effectiveness within a selected range of overall catalyst chloriding effectiveness values and the reaction temperature within a selected range of reaction temperatures, while maintaining the other of the overall catalyst chloriding effectiveness and the reaction temperature at a constant value, to yield the desired alkylene oxide production parameter. The process is operated at an initial overall catalyst chloriding effectiveness value and an initial reaction temperature to yield an initial value of an alkylene oxide production parameter. A desired value of the alkylene oxide production parameter is selected, and one selected from the overall catalyst chloriding effectiveness value of the feed gas and the reaction temperature is adjusted while maintaining the other of the overall catalyst chloriding effectiveness value and the reaction temperature at a substantially constant value to yield the desired value of the alkylene oxide production parameter. The overall catalyst chloriding effectiveness value is preferably adjusted within a selected range, and the reaction temperature is preferably adjusted within a selected range.