CHEMICAL PRODUCTION PROCESSES, SYSTEMS, AND CATALYST COMPOSITIONS

RELATED PATENT DATA

This application is a continuation in part of U.S. patent applications: Ser. No. 11,895,362, entitled Chemical Production Processes, Systems, and Catalyst Compositions by Peterson et al. which was filed on Aug. 24, 2007; Ser. No. 11,895,593, entitled Chemical Production Processes, Systems, and Catalyst Compositions by Peterson et al. which was filed on Aug. 24, 2007; Ser. No. 11,895,592, entitled Chemical Production Processes, Systems, and Catalyst Compositions by Peterson et al. which was filed on Aug. 24, 2007; the entirety of all are incorporated by reference herein.

TECHNICAL FIELD

The present disclosure relates to chemical production processes, systems, and catalyst compositions.

BACKGROUND OF THE DISCLOSURE

Chemical production process development can lead to the discovery of process parameters such as by-products that were previously unknown in the art. These previously unknown process parameters may limit the efficiency of the process being developed. The present disclosure provides processes, systems, and catalysts, embodiments of which, can overcome a previously unknown limiting process parameters.

SUMMARY OF THE DISCLOSURE

Chemical production processes are provided that can include exposing a reactant composition to a catalyst composition to form a product composition. The reactant composition can include a multihydric alcohol compound and the product composition can include a carbonyl compound. The catalyst composition can include a metal effective to facilitate catalyst activation.

Processes disclosed also include supplementing a dehydration catalyst with a promoter, and activating the supplemented catalyst in the presence of oxygen.

Processes also include providing a supplemented dehydration catalyst to within a reactor, and exposing a multihydric alcohol compound to the dehydration catalyst, with the exposing forming coke within the reactor. Oxygen can be provided to the reactor to remove at least a portion of the coke.

Dehydration catalysts are also provided that can include one or more elements from group 10 of the periodic table of elements.

Chemical production systems are provided that can include a reactant reservoir coupled to a reactor with the reactor containing a catalyst having one or more elements from group 10 of the periodic table of elements.

BRIEF DESCRIPTION OF THE DRAWINGS

Preferred embodiments of the disclosure are described below with reference to the following accompanying drawings.

FIG. **1** is a chemical production system according to an embodiment of the disclosure.

FIG. **2** is a chemical production system according to another embodiment of the disclosure.

FIG. **3** is a portion of a chemical production system according to an embodiment of the disclosure.

FIG. **4** is a plot of data acquired utilizing an embodiment of the disclosure.

FIG. **5** is a plot of data acquired utilizing an embodiment of the disclosure.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

This disclosure is submitted in furtherance of the constitutional purposes of the U.S. Patent Laws "to promote the progress of science and useful arts" (Article 1, Section 8).

The chemical production processes of the present disclosure will be described with reference to FIGS. **1-5**. Referring first to FIG. **1**, a chemical production process system **10** is shown that includes a reactor **12** coupled to both a reactant reservoir **14** and a product reservoir **16**. In accordance with the present disclosure, reactant reservoir **14** can be coupled to reactor **12** utilizing conduits that facilitate the flow of reactant from reactant reservoir **14** to reactor **12**. This flow can be facilitated utilizing pressure differentials between reactant reservoir **14** and reactor **12**. For example, these pressure differentials can be facilitated utilizing pumps to provide a pressure differential between reactant reservoir **14** and reactor **12**. The reactant within reactant reservoir **14** can be a hydroxyl compound and/or a multihydric alcohol compound. An example multihydric alcohol compound can include the compound glycerol, which when dehydrated can result in a product composition that includes one or both of acrolein and/or acetol, for example.

Reactor **12** can include a housing that can be configured to house a catalyst and be utilized to facilitate the exposure of the reactant within reactant reservoir **14** to catalyst within reactor **12**. The catalyst can be a dehydration catalyst and the catalyst can be supported and/or unsupported catalyst, for example. Unsupported catalysts can be referred to as bulk catalysts. Reactor **12** can be jacketed or can be configured as a fluidized bed reactor, for example. Reactant and catalyst within reactor **12** can be configured to perform a dehydration reaction such as the dehydration of the multihydric compound glycerol to a product composition that can include one or both of acrolein and/or acetol, for example.

The product composition provided to product reservoir **16** can be a dehydration product of the multihydric alcohol compound such as a carbonyl compound. The pressure differential apparatus used to facilitate the transfer of reactant from reactant reservoir **14** can also be utilized to provide product from reactor **12** to product reservoir **16**. In accordance with an example embodiment, system **10** can be configured to expose a multihydric alcohol compound such as glycerol from reservoir **14** to a catalyst composition within reactor **12** to form a product composition including one or both of acrolein and acetol.

In accordance with another embodiment, FIG. **2** depicts a chemical production system **20** that includes a reactor **22** coupled to a reactant reservoir **24** as well as a product reservoir **26**. Reactant of reactant reservoir **24** can be a multihydric alcohol compound, for example. To facilitate the flow of reactant from reactant reservoir **24** to reactor **22**, a carrier composition **28** including a gas or liquid such as nitrogen is provided to a reactant reservoir conduit utilizing flow control **30**. In accordance with another embodiment CO_2 can be utilized as the carrier composition **28**. These solid support beds were also treated with CO_2 and reactant from reactor reservoir **24** can be combined with carrier composition **28** and provided to reactor **22**.