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(54) **CHEMICAL PRODUCTION PROCESSES, SYSTEMS, AND CATALYST COMPOSITIONS**

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See application file for complete search history.

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(57) **ABSTRACT**

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.

12 Claims, 5 Drawing Sheets