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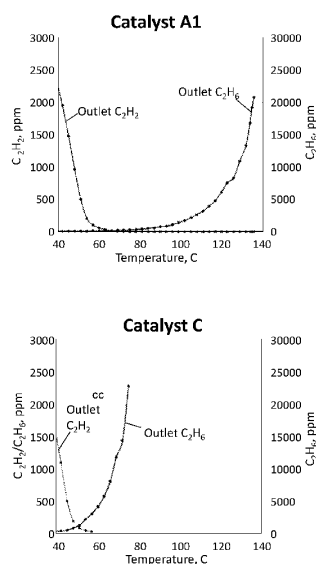


Figure 1

(57) Abstract: The present disclosure relates to methods for selectively hydrogenating acetylene, to methods for starting up a selective hydrogenation reactor, and to hydrogenation catalysts useful in such methods. In one aspect, the disclosure provides a method for selectively hydrogenating acetylene, the method comprising contacting a catalyst composition with a process gas. The catalyst composition comprises a porous support, palladium, and one or more ionic liquids. The process gas includes ethylene, present in the process gas in an amount of at least 20 mol.%; acetylene, present in the process gas in an amount of at least 1 ppm; and 0 to 190 ppm or at least 600 ppm carbon monoxide. At least 90% of the acetylene present in the process gas is hydrogenated, and the selective hydrogenation is conducted without thermal runaway.

[Continued on next page]

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