the partial pressure of the alkane or paraffin. The catalyst fines contained in the reactor effluent stream cannot easily be separated from quench water, leading to excessive fouling in the equipment and consequential high maintenance costs. Thus, there is also a need for improved recovery of catalyst fines found in the effluent stream from the dehydrogenation reactor.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] The FIGURE 1 is a schematic illustration of a process for catalytic paraffin dehydrogenation and catalyst recovery of the kind described herein.

SUMMARY

[0005a] In an aspect, there is provided a process for dehydrogenating paraffins, the process comprising:

contacting at least one metal oxide catalyst with a paraffin having 2-8 carbon atoms for a reaction period ranging from about 0.05 seconds to about 10 minutes in a reactor;

wherein the paraffin is selected from a group consisting of propane, n-butane, isobutane, and combinations thereof;

wherein the metal oxide catalyst is selected from a group consisting of oxides of zinc, titanium, copper, iron, manganese, aluminum, silicon, zirconium, cerium, dysprosium, erbium, europium, gadolinium, lanthanum, neodymium, praseodymium, samarium, terbium, ytterbium, yttrium, niobium, and combinations thereof; and

wherein the metal oxide catalyst is substantially free of platinum and chromium.

[0006] There is provided, in one form, a process for dehydrogenating paraffins by contacting a metal oxide catalyst with a paraffin having 2-8 carbon atoms in a riser, fluidized bed, or fixed-bed swing reactor for a reaction period ranging from about 0.05 seconds to about 10 minutes. In one example, the metal

oxide catalyst is selected from group consisting of oxides of zinc, titanium, copper, iron, manganese, aluminum, silicon, zirconium, cerium, dysprosium, erbium, europium, gadolinium, lanthanum, neodymium, praseodymium, samarium, terbium, ytterbium, yttrium, niobium, and combinations thereof, wherein the metal oxide catalyst is substantially free of platinum and chromium.

[0006a] In another aspect, there is provided a process for recovering catalyst fines from a reactor effluent stream of a catalytic paraffin dehydrogenation reaction, the process comprising:

a. contacting a metal oxide catalyst with a paraffin having 2-8 carbon atoms in a reactor, where
    i. wherein the paraffin is selected from a group consisting of propane, n-butane, isobutane, and combinations thereof;
    ii. wherein the metal oxide catalyst is selected from a group consisting of oxides of zinc, titanium, copper, iron, manganese, aluminum, silicon, zirconium, cerium, dysprosium, erbium, europium, gadolinium, lanthanum, neodymium, praseodymium, samarium, terbium, ytterbium, yttrium, niobium, and combinations thereof; and
    iii. wherein the metal oxide catalyst is substantially free of platinum and chromium;
b. generating a reactor effluent stream comprising metal oxide catalyst fines after contacting with the metal oxide catalyst with the paraffin; and
c. contacting the reactor effluent stream with a wash fluid to transfer the metal oxide catalyst fines from the reactor effluent stream into the wash fluid and form a cooled catalyst effluent stream and a substantially catalyst-free product stream.

[0007] There is further provided in another form, a process for recovering catalyst fines from the reactor effluent stream of a catalytic paraffin dehydrogenation

reaction in a riser or fluidized-bed type reactor, the process comprising: contacting a metal oxide catalyst with a paraffin having 2-8 carbon atoms; generating a reactor effluent stream comprising metal oxide catalyst fines after contacting the metal oxide catalyst with the paraffin; and contacting the reactor effluent stream with a wash fluid to transfer the metal oxide catalyst fines from the reactor effluent stream into the wash fluid and form a cooled catalyst effluent stream and a substantially catalyst-free product stream.