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(54) Title: METHOD AND SYSTEM FOR LIGHT OLEFIN GENERATION WITH HIGH YIELDS AND SELECTIVITY

(57) Abstract: A method for forming an olefin, the method including: introducing a hydrocarbon feed stream into a reactor including a dehydrogenation catalyst; reacting the hydrocarbon feed stream with a dehydrogenation catalyst in the reactor to form a high temperature dehydrogenated product, the high temperature dehydrogenated product including at least a portion of the dehydrogenation catalyst; separating at least a portion of the dehydrogenation catalyst from the high temperature dehydrogenated product in a primary separation device and a secondary separation device downstream of and in fluid communication with the primary separation device; following the exit of high temperature dehydrogenation product from the secondary separation device, combining the high temperature dehydrogenation product with a quench stream to cool the high temperature dehydrogenation product and form an intermediate temperature dehydrogenation product, wherein the quench stream includes a hydrocarbon; and cooling the intermediate temperature dehydrogenation product to form a cooled dehydrogenation product.



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