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(54) Title: AUTO THERMAL CRACKING REACTOR

(57) Abstract: The present invention provides a reactor design that enables an auto-thermal cracking process to be conducted at any suitable pressure wherein the gaseous reactants are preheated separately before mixing and then presented to the reaction zone in a uniformly distributed manner. In particular, the present invention relates to apparatus for reacting a first and second gaseous reactant to form a gaseous product wherein the apparatus comprises at least one first supply means for the first gaseous reactant, at least one second supply means for the second gaseous reactant, a resistance zone and a reaction zone, preferably comprising a catalyst, wherein the first supply means comprises a plurality of first outlets for delivery of the first gaseous reactant, and the second supply means comprises a plurality of second outlets for delivery of the second gaseous reactant, the resistance zone is porous, the reaction zone is positioned downstream of the resistance zone with respect to the flow of the first and second gaseous reactants and wherein the first supply means and the second supply means are arranged such that the first gas and the second gas are contacted in an essentially parallel manner and mixed prior to contacting the resistance zone. The present invention also provides a process for the production of a mono-olefin utilizing said apparatus.

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