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Tonkovich et al.

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(54) **INTEGRATED REACTORS, METHODS OF MAKING SAME, AND METHODS OF CONDUCTING SIMULTANEOUS EXOTHERMIC AND ENDOTHERMIC REACTIONS**

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This patent is subject to a terminal disclaimer.

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(52) **U.S. Cl.**
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(58) **Field of Classification Search**
USPC 422/129, 130, 600, 603, 211, 198; 29/428

See application file for complete search history.

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(57) **ABSTRACT**

Integrated Combustion Reactors (ICRs) and methods of making ICRs are described in which combustion chambers (or channels) are in direct thermal contact to reaction chambers for an endothermic reaction. Superior results were achieved for combustion chambers which contained a gap for free flow through the chamber. Particular reactor designs are also described. Processes of conducting reactions in integrated combustion reactors are described and results presented. Some of these processes are characterized by unexpected and superior results.

18 Claims, 22 Drawing Sheets

