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(54) **SEPARATION OF HYDROGEN FROM HYDROCARBONS UTILIZING ZEOLITIC IMIDAZOLATE FRAMEWORK MATERIALS**

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C01B 33/20	(2006.01)
C01B 39/04	(2006.01)
C01B 39/02	(2006.01)
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(58) **Field of Classification Search** 423/210, 423/245.1, 248, 648.1, 700, 701, 702, 704, 423/705, 706, 708; 502/400, 401; 95/43, 95/45, 55, 90, 141, 143, 144, 145, 273, 274, 95/902

See application file for complete search history.

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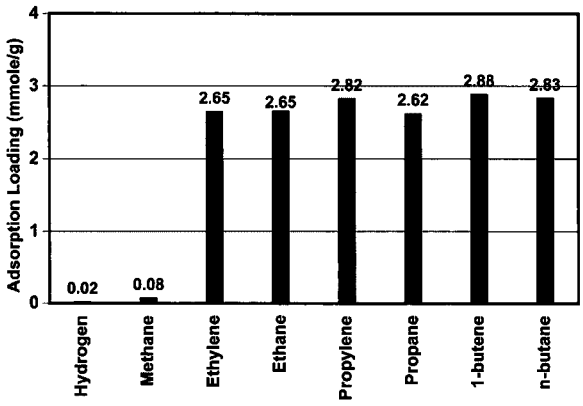
(57) **ABSTRACT**

The present invention relates to the selective separation of hydrogen ("H_2") hydrocarbons in streams containing both hydrogen and hydrocarbons (e.g. methane, ethylene, ethane, propylene, propane, etc.) utilizing a zeolitic imidazolate framework ("ZIF") material. Preferably, the stream to be separated is fed to the present process in a substantially gaseous phase. In preferred embodiments, the current invention is utilized in either a pressure swing adsorption process, a temperature swing adsorption process, or a membrane separations process to separate hydrogen from hydrocarbons present in hydrogen production streams or petrochemical/petroleum refining product streams and intermediate streams.

28 Claims, 28 Drawing Sheets



ZIF-9 Adsorption Loading for Hydrogen and Various Hydrocarbons @ 301 K and 106.6 kPa