Title (en)

CHEMICAL PROCESSING USING NON-THERMAL DISCHARGE PLASMA

Title (de)

CHEMISCHE VERARBEITUNG UNTER VERWENDUNG EINES NICHTTHERMISCHEN ENTLADUNGSPLASMAS

Title (fr)

TRAITEMENT CHIMIQUE A L'AIDE D'UN PLASMA DE DECHARGE NON THERMIQUE

Publication

EP 1472179 A2 20041103 (EN)

Application

EP 02802757 A 20020802

Priority

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- US 30953001 P 20010802
- US 35834002 P 20020219

Abstract (en)

[origin: WO03040027A1] A method for activating chemical reactions using non-thermal capillary discharge plasma (NT-CDP) unit or a non-thermal slot discharge plasma (NT-SPD) unit (collectively referred to as "NT-CDP/SDP"). The NT-CDP/SDP unit includes a first electrode disposed between two dielectric layers (8 and 9), wherein the first electrode and dielectric layers having at least one opening (e.g., capillary or a slot) defined therethrough. A dielectric sleeve (3) inserted into the opening, and at least one second electrode (2) (e.g., in the shape of a pin, ring, metal wire, or tapered metal blade) is disposed in fluid communication with an associated opening. A non-thermal plasma discharge is emitted from the opening when a voltage differential is applied between the first and a second electrodes. Chemical feedstock to be treated is then exposed to the non-thermal plasma. This processing is suited for the following exemplary chemical reactions as (i) partial oxidation of hydrocarbon feedstock to produce fictionalized organic compounds; (ii) chemical stabilization of a polymer fiber (e.g., PAN fiber precursor in carbon fiber production; (iii) pre-reforming of higher chain length petroleum hydrocarbons to generate a feedstock suitable for reforming; (iv) natural gas reforming in a chemically reducingatmosphere (e.g., ammonia or urea) to produce carbon monoxide andhydrogen gas; or (v) plasma enhanced water gas shifting.

IPC 1-7

C01B 3/24; C10G 27/04; C10G 32/02; C10G 35/16

IPC 8 full level

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