PCT WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 : B01J 20/34	A1	(11) International Publication Number: WO 99/58238
		(43) International Publication Date: 18 November 1999 (18.11.99)

(21) International Application Number: PCT/US99/10011

(22) International Filing Date: 8 May 1999 (08.05.99)

(30) Priority Data:
09/079,100 14 May 1998 (14.05.98) US

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(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published
With international search report.
Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.

(54) Title: THE USE OF PHOSPHORUS TO ENHANCE THE ACID SITES OF FCC CATALYSTS

(57) Abstract

The present invention discloses aqueous methods for enhancing the acid sites of fluid catalytic cracking (FCC) catalysts. The methods comprise the steps of contacting an FCC catalyst, either spent or fresh, with an aqueous solution comprising water, and a source of both phosphorus and aluminum. Optionally the solution includes sulfurous or sulfuric acid. The phosphorus is provided by phosphoric acid, phosphorous acid or ammonium dihydrogen phosphate. The aluminum is provided by an aluminum source selected from the group consisting of the alumina trihydrates and aluminum oxide. Chloride contamination of the aluminum source should be minimal, preferably less than about 1000 ppm chloride, more preferably less than about 200 ppm chloride. The pH of the aqueous solution is adjusted to about 3–12 by the addition of a sufficient quantity of an aqueous ammonium solution. The FCC catalyst is added to this solution, preferably with stirring, in a weight ratio of about 1 part catalyst to about 1–10 parts water to prepare an aqueous slurry. Upon stabilization of the pH of the aqueous slurry, enhancement of the acid sites of the catalyst is achieved and the catalyst may be separated from the slurry and, if desired, washed. This simple, aqueous process reduces the level of many metal poisons, including nickel and vanadium, on the FCC catalyst and produces a catalyst having an enhanced number of acid reaction sites.