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RHEINISCHE BRAUNKOH (DOLK/) *DE 3108-798
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Catalyst for hydrogenation of slurried coal - is reaction prod. of iron sulphate with sub-stoichiometric amt. of alkali

H(9-A1) N(2-A) 012

In a process for the liquefaction of coal by the hydrogenation, at 420-490°C and 80-500 bars, of a slurry of the coal in a high b.pt. hydrocarbon, the catalyst used is the reaction prod. of iron sulphate with a sub-stoichiometric amt. of an alkali, e.g. NaOH, at pref. pH 4.5-7.5.

ADVANTAGES

The catalyst is cheap and is effective at relatively low pressures and relatively low (1-5 wt.%, calc. as Fe) concns.

DETAILS

The Fe cpd. may be $FeSO_4.7H_2O$ or its technical forms. The alkali may be NaOH, KOH, NH_4OH, the corresponding carbonates or sodium sulphide. The prod. can also have pH above 7.5. The catalyst can be used wet or dry. It may be mixed with Fe oxide (as such, or in technical forms such as Bayermasse, Luxmasse, red mud or bog iron ore) or Fe sulphide (e.g. as pyrites). The hydrogenation is pref. effected in the presence of S, e.g. by adding 2% S to the catalyst or by having sufficient H_2S in the reaction gas.

EXAMPLE

1 kg technical $FeSO_4$ (H_2O content 38%) was stirred to a paste with 180 ml water. 110 ml 10% NaOH was added, giving pH 5.5. The well-mixed paste was dried at 140°C to 3% H_2O, and then ground so that 82% was in particles below 50 microns.

4% of this catalyst and 1.2% S (based on the coal) were added to a mixt. of 39% fine-ground brown coal and a high b.pt. slurrying oil obtd. by hydrogenating brown coal. Hydrogenation at a temp. of 470°C and 280 bars gave 98% conversion of the coal. (7pp1492).

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