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Coal liquefaction by solvent extn. and hydrocracking - using prod. fraction free of heptane insolubles as solvent

H(9-A1)

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Coal liquefaction is carried out by (a) slurrying particulate coal in a solvent, (b) contacting the slurry with H2 in a dissolver, (c) contacting at least a fraction of the dissolver effluent with a hydrocracking catalyst, (d) treating at least a fraction of the hydrocracked effluent with a nonsolvent to remove heptane insolubles (HI), and (e) recyling the HI-free liq. to step (a) as solvent.

ADVANTAGES

The process produces clean normally liq. hydrocarbon with minimal gas prodn. and high operating stability.

DETAILS

Step (a) is pref. effected in the absence of catalyst and externally supplied contact particles at 425-480 deg.C. The whole effluent can be passed to the hydrocracker, or water and light gases can be removed.

Step (b) is pref. effected in a fixed-bed reactor at 340-400 deg.C and an H2 partial pressure of 70-210 atm. The hydrocracked effluent is pref. fractionated to recover a 200 deg. C+ fraction which is then treated to remove solids before being passed to step (c). The 200 deg.C+ fraction pref. has a HI content of 1-5 wt.%.

Step (c) is pref. effected using a nonsolvent/feed wt. ratio of 0.1-10:1. Sepn. of the HI (and prior sepn. of solids) can be effected using a cyclone separator, a filter, a centrifuge and/or a gravity decanter.(21pp367).