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MOBIL OIL CORP *EP --20-141
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Hydrocarbon prodn. from coal by gasification - followed by Fischer-Tropsch synthesis and zeolite upgrading (BR 30.12.80)

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Prodn. of hydrocarbons from coal is carried out by (a) gasifying the coal to produce synthesis gas having a low H2/CO ratio, (b) converting the synthesis gas to 1-50C hydrocarbons and oxygenates by Fischer-Tropsch (F-T) synthesis, and (c) upgrading the F-T products by contact with a zeolite catalyst.

Step (a) is effected in a gasifier which operates with a steam supply of less than 30 lb per MSCF of synthesis gas and at an exit gas temp. of less than 2000 deg. F to produce synthesis gas with an H2/CO ratio of 0.4-1.0.

Step (b) is effected in a slurry-type reactor contg. a catalyst or combination of catalysts having shift-conversion and CO-reducing activity suspended in a liq. medium. Heat is recovered from the reactor in the form of medium-pressure steam, which is used in the gasifier or its associated O2-generating plant.

Step (c) is effected with a zeolite catalyst having a constraint index of 1-12, a SiO2/Al2O3 ratio of at least 12 and a dried crystal density of at least 1.6 g/cc, to produce hydrocarbon products including LPG, gasoline and distillates..

H4-E5, 9-A1, 9-C)

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Advantages

The overall thermal efficiency of the process is high (at least 70%).

Details

Step (a) is pref. effected in a Lurgi slagging gasifier. Step (b) is pref. effected at 204-316 deg.C and 344.5-4823 kPa with a space velocity designed to give at least 50% conversion. The F-T products can be passed directly to step (c) or they can be sepd. and processed separately. The C4-products can be subjected to alkylation or polymerisation to produce gasoline; H2 and CO can be recycled to the F-T reactor; part of the C2-hydrocarbons can be used as fuel in the process. Step (c) is pref. effected at 288-454 deg.C and 344.5-4823 kPa using an HZSM-5 catalyst. **EP--20141**