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Synthesis gas useful as fuel - prepd. by partial oxidn. of aq. suspension of mixt. of sub:bituminous coal or lignite with petroleum coke

A process for mfr. of a synthesis gas by partial oxidn. uses as fuel a mixt. of 50-75 wt. % subbituminous coal or lignite and 25-50 wt. % petroleum coke. The mixt. is burnt as a suspension in water. If necessary, S cpds. are removed from the gas by established methods (e.g. using ethanoxirine)

USES

The prod. is a useful source of energy, esp. in replacing natural gas and in electricity generation. It may be burnt to raise steam or in a gas turbine.

ADVANTAGES

A gas of adequate calorific value is obtd. while using, in part, a low-grade coal. (Without the coke, the calorific value would be too low). Sulphur emissions are reduced.

DETAILS

Suitable coals include subbituminous Colorado- or Montana-coal and Montana- or North-Dakota-lignite. The coke is prepd. by the delayed coking process, etc.

The fuel mixt. is ground so that 100% passes a sieve of mesh size 1.42 mm, and pref. at least 60% passes a sieve of mesh size 0.074 mm. The wt. ratio water/fuel in the reaction zone is pref. 0.5-1.0. The partial oxidation occurs in a synthesis gas producer at a temp. of pref. 1093-1538°C a press. of pref. 42-84 bar, and an atomic ratio of free oxygen to carbon of pref. 0.8-1.4. The combustion can be in a ring burner as described in US Patent 2928460. The oxidant gas can opt. be preheated to 649°C max. The suspension can be preheated to 316°C max. to improve its pumpability.

The calorific value required in the prod. gas is about 3731-5892 kJ/Ncu.m.

EXAMPLE

The feed to a gasifier contained 36% of a Wyoming coal (with 51.8% dry wt. C, 15.9% O and 26.5% ash), 24% petroleum coke and 40% water. It was gasified at 42.4 bar and 1369°C, at a O/C atom ratio of 1.24. The prod. contained (mol. %): N₂, 52.9; H₂O, 14.9; CO, 13.4; CO₂, 9.0; H₂, 8.9; etc. After removal of CO₂ and H₂S, its calorific value was 3731 kJ/N cu.m. (16pp1492).

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