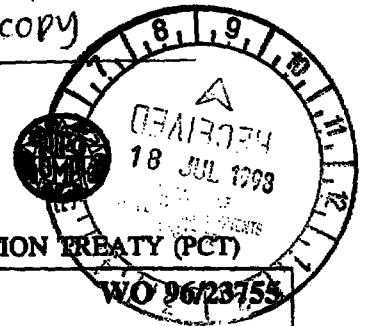


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(54) Title: **PREPARATION OF FUEL GRADE DIMETHYL ETHER**

(57) Abstract

A process for the preparation of fuel grade dimethyl ether from a hydrogen and carbon oxides containing synthesis gas, wherein the synthesis gas is converted to a mixed process gas of dimethyl ether, methanol and water in one or more catalytic reactors in the presence of a catalyst having activity both in synthesis of methanol and methanol dehydration; the mixed process gas is cooled to obtain a liquid process phase containing the produced methanol, dimethyl ether and water and a gaseous process phase containing unconverted synthesis gas and a part of produced dimethyl ether, which process comprises further steps of separating the gaseous phase and liquid phase; passing the liquid phase to a first distillation unit and distilling off a top product stream containing dimethyl ether and methanol and withdrawing a bottom stream containing methanol and water; passing the bottom stream to a second distillation unit and distilling off a methanol containing stream, introducing the methanol into a purge washing unit; washing the gaseous process phase with the methanol in a purge washing unit and withdrawing from the unit a washing stream of dimethyl ether and methanol; converting a part of the methanol in the washing stream to dimethyl ether and water in a catalytic dehydration reactor by contact with a dehydration catalyst; withdrawing from the dehydration reactor a product stream of dimethyl ether, water and unconverted methanol; and combining the top product stream from the first distillation unit with the product stream from the dehydration reactor to obtain a combined product stream of fuel grade dimethyl ether.

