

PROCESS AND EQUIPMENT FOR CONVERTING CARBON DIOXIDE IN FLUE GAS INTO NATURAL GAS BY USING DUMP POWER ENERGY

ABSTRACT

A process for converting carbon dioxide in flue gas into natural gas by using dump power energy. The process uses the dump power energy to electrolyze water to generate hydrogen gas; the hydrogen gas and carbon dioxide captured from industrial flue gas are subjected to a methanation reaction; heat generated from the methanation reaction is used to heat water to generate superheated water vapor for driving a steam turbogenerator to generate power for supplementing power energy for electrolyzing water, and thus natural gas is obtained by synthesizing. Equipment used in synthesized natural gas is further provided. The equipment is mainly formed by combining a transforming and rectifying device (1), an electrolytic bath (2), a steam turbogenerator (4), a carbon dioxide heater (21), at least two-stage of fixed bed reactors (11, 13), various indirect heat exchangers, a steam drum (12), a natural gas condenser (8), and a process water pipeline (3).

Fig 1