allow for addition of additional carbon dioxide to the process still resulting in a module required for methanol synthesis.

Summary

In one aspect of the present disclosure, there is provided a method for the preparation of synthesis gas comprising the steps of

(a) providing a hydrocarbon feed stock;

(b) preparing a separate hydrogen containing stream and a separate oxygen containing stream by electrolysis of water and/or steam;

(c) steam reforming a first part of the hydrocarbon feed stock from step (a) in a tubular steam reformer to a tubular steam reformed gas comprising hydrogen, carbon monoxide and carbon dioxide;

(d)autothermal reforming a second part of the hydrocar-bon feed stock in an autothermal reformer with at least part of the oxygen containing stream obtained in step (b) to an autothermal reformed gas stream comprising hydrogen, carbon monoxide and carbon dioxide;

(e)combining the steam reformed gas from step (c) with the autothermal reformed gas from step (d);

(f) adding at least part of the separate hydrogen containing stream from step (b) into the hydrocarbon feed stock from step (a) and/or into the steam reformed gas stream from step (c)and/or into the autothermal reformed gas stream from step (d) and/or into the combined steam reformed gas and autothermal reformed gas stream from step (e); and

(g) withdrawing the synthesis gas.

Description

Thus, this invention provides a method for the preparation of synthesis gas comprising the steps of

(a) providing a hydrocarbon feed stock;

(b) preparing a separate hydrogen containing stream and a separate oxygen containing stream by electrolysis of water and/or steam;

(c) steam reforming a first part of the hydrocarbon feed stock from step (a) in a tubular steam reformer to a tubular steam reformed gas comprising hydrogen, carbon monoxide and carbon dioxide;

(d)autothermal reforming a second part of the hydrocarbon feed stock in an autothermal reformer with at least part of the oxygen containing stream obtained in step (b) to an autothermal reformed gas stream comprising hydrogen, carbon monoxide and carbon dioxide;

(e)combining the steam reformed gas from step (c) with the autothermal reformed gas from step (d);

(f) adding at least part of the separate hydrogen containing stream from step (b) into the hydrocarbon feed stock from step (a) and/or into the steam reformed gas stream from step (c)and/or into the autothermal reformed gas stream from step (d) and/or into the combined steam reformed gas and autothermal reformed gas stream from step (e); and

(g) withdrawing the synthesis gas.

Tubular steam reforming creates CO_2 in the flue gas from the burners in the tubular steam reforming. The Co_2 in the