

**Claims**

- 5     1. 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
- 10    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;
- 15    (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;
- 20    (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
- 25    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.

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2. The method of claim 1, wherein carbon dioxide in flue gas from the tubular steam reformer is recovered and added to the steam reforming in step (c).
- 5 3. The method of claim 1 or 2, wherein the electrolysis of water and/or steam in step (b) is powered by renewable energy.
4. The method of any one of claims 1 to 3, wherein the  
10 hydrogen stream is added to the combined tubular steam reformed gas and autothermal reformed gas stream in an amount to provide a module  $M = (H_2 - CO_2) / (CO + CO_2)$  in the synthesis gas withdrawn in step (g) of between 1.9 and 2.2.
- 15 5. The method of claim any one of claims 1 to 4, wherein the module  $M = (H_2 - CO_2) / (CO + CO_2)$  in the synthesis gas withdrawn in step (g) is in the range from 2 to 2.1.
6. The method of any one of claims 1 to 5, comprising the  
20 further step of heat exchange reforming a part of the hydrocarbon feedstock from step (a) and/or the tubular steam reformed gas from step (c).
7. The method of any one of claims 1 to 6, wherein the  
25 hydrocarbon feed stock comprises natural gas, methane, LNG, naphtha or mixtures thereof either as such or pre-reformed and/or desulfurized.
8. The method of any one of claims 1 to 7, wherein the  
30 synthesis gas withdrawn in step (g) is in a further step converted to a methanol product.