silicates. In a further embodiment of the catalyst, silicon oxide sols, methyl celluloses or water glass are used as binding agents.

[0020] In an embodiment of the invention all doping and activation elements in the inventive catalyst are homogeneously distributed in the entire volume of the catalyst layer.

[0021] The invention also covers a catalyst for use in a reactor for vinyl acetate synthesis characterised in that the palladium content of the catalyst is 0.5 to 10% by weight, preferably 0.8 to 5% by weight. In another advantageous composition of the catalyst the gold content of the catalyst is 0.25 to 5% by weight, preferably 0.4 to 2.5% by weight. In another advantageous composition of the catalyst according to the invention, the potassium content of the catalyst is 0.5 to 10% by weight and preferably 1 to 4% by weight.

[0022] As a typical use of the invention, the catalyst is used in a reactor that comprises a number of tubes or stacked plates which have a number of gaps whereby the tubes or gaps can be aligned in any way with regard to each other and ideally run parallel to each other.

[0022a] In one aspect, there is provided a catalyst for producing vinyl acetate, containing

- 0.25 to 5 percent by weight palladium, 0.25 to 5 percent by weight gold, and 0.5 to 10 percent by weight potassium, and
- with the property that the catalyst is dispersed on an oxidic carrier material, and
- the catalyst is used in a reactor that comprises a number of tubes or stacked plates which have a number or gaps whereby the tubes or gaps can be aligned in any way with regard to each other and ideally run parallel to each other,

characterized in that

- the catalyst is adhesively applied by way of an oxidic or organic binding agent to a wall surface that is made of stainless steel, and
- the oxidic binding agent are alkali metal silicates.

[0023] Advantageously the catalyst according to the invention can be used in explosive process conditions with no restrictions with regard to the optimum operating parameters having to be taken into account because of explosive states being attained. Explosive conditions are taken to mean gas mixtures with a composition which could explode in a defined volume in the conditions present during the process, such as temperature and pressure. Of particular technical relevance is the lower explosion limit for oxygen which in US 3,855,280 is typically quantified at 8%. With the method according to the invention process conditions are covered in which an O_2 content of over 7% by volume is present in the process gas.

[0024] To test the device according to the invention, the catalyst was prepared in an analogue manner to the preparation in EP 1 008 385 A1 with a powder carrier containing SiO_2 being used identical in composition to the usual bulk catalyst carrier. The catalyst was then applied to two stainless steel plates with webs and activated with potassium acetate. The pairs of plates were connected to each other so that the catalyst layers were opposite each other with a gap of approx. 500 µm being formed. This pair of plates was placed in a pressure-resistant reactor heated by oil and operated almost completely isothermally at 155°C. The temperature increase was less than 1 K whereby measurements were taken at 5 measuring points along the path of flow.