[0016] The synthesis reactor according to the invention comprises a catalyst which is adhesively applied to the wall surfaces of the reaction chambers by means of ~~a~~ binding agent.

[0016a] In one aspect, there is provided a synthesis reactor with a wall catalyst for producing vinyl acetate, in which gaseous ethylene and acetic acid as well as oxygen or gases containing oxygen undergo a catalytic reaction, the synthesis reactor with the wall catalyst being characterised in that the catalytic synthesis takes place in a number of reaction chambers with the wall catalyst, whereby at least one wall of the reaction chambers is coated with catalyst, and at least one wall of the reaction chambers with the wall catalyst is indirectly cooled, characterised in that the wall catalyst is supported on a powder carrier containing SiO_2, and the wall catalyst is adhesively applied to the wall surfaces of the reaction chambers by way of an oxidic or organic binding agent in a synthesis reactor that is made of stainless steel.

[0017] Metals can be distributed over the entire catalyst layer, since due to the small layer thickness and the high porosity of the carrier material there are no mass transport resistances during the reaction which have a negative effect on the activity. There is no shell structure as is usual in moulded bodies.

[0018] Advantageously the method 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.

[0019] 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.

[0020] 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.