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**Datasheet for the decision  
of 12 September 2006**

**Case Number:** W 0005/04 - 3.3.07

**Application Number:** PCT/GB02/05761

**Publication Number:** WO 03/061829

**IPC:** B01J 37/02

**Language of the proceedings:** EN

**Title of invention:**

Process for the preparation of a microspheroidal catalyst

**Applicant:**

BP Chemicals Ltd.

**Opponent:**

-

**Headword:**

-

**Relevant legal provisions:**

PCT R. 13.1, 13.2, 13.3

**Keyword:**

-

**Decisions cited:**

-

**Catchword:**

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Case Number: W 0005/04 - 3.3.07

International Application No. PCT/GB02/05761

**D E C I S I O N**  
of the Technical Board of Appeal 3.3.07  
of 12 September 2006

**Applicant:** BP Chemicals Limited  
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**Decision under appeal:** Protest according to Rule 68.3(c) of the Patent Cooperation Treaty made by the applicants against the invitation of the European Patent Office (International Preliminary Examining Authority) to restrict the claims or pay additional fees dated 8 October 2003.

**Composition of the Board:**

**Chairman:** B. Struif  
**Members:** B. ter Laan  
S. Hoffmann

## Summary of Facts and Submissions

- I. International patent application PCT GB02/05761, published under No. WO 03/061829, was filed on 18 December 2002. It contains 38 claims including several independently formulated claims.

Claim 1 reads as follows:

"A process for preparing a catalyst active for the fluid bed acetoxylation of ethylene to produce vinyl acetate, which process comprises the steps of:

- (a) impregnating microspheroidal silica support particles by the incipient wetness technique with an aqueous solution of palladium and gold compounds, whilst agitating the support particles;
- (b) drying the impregnated support particles produced in step (a) whilst agitating the impregnated support particles;
- (c) reducing the palladium and gold compounds of the impregnated support particles produced in step (b) to respective metals by adding the dried, impregnated support particles to an aqueous solution of hydrazine, whilst stirring, to form a slurry;
- (d) filtration of the slurry produced in step (c) to remove the excess reduction solution;
- (e) washing the filter cake/slurry produced in step (d) with water and removing excess water to form a cake;
- (f) impregnating the cake produced in step (e) with one or more salts of Group I, Group II, lanthanide and transition metals by blending the cake produced in step (e) with one or more solid salts of Group I, Group II, lanthanide and transition metals; and

(g) drying the impregnated cake produced in step (f) whilst agitating the impregnated cake to form free-flowing catalyst particles."

Claim 15 reads:

"A process for impregnating microspheroidal catalyst support particles with at least one compound of a catalytically active group VIII noble metal, which process comprises the steps of:

(a') impregnating the microspheroidal support particles by the incipient wetness technique with an aqueous solution of the at least one catalytically active group VIII noble metal, whilst agitating the support particles; and

(b') drying the impregnated support particles produced in step (a') whilst agitating the impregnated support particles."

Claim 30 reads:

"A process for the purification of a waste stream comprising dilute aqueous hydrazine, which process comprises contacting the waste stream with a catalyst active for the decomposition of the hydrazine to nitrogen and ammonia, said catalyst comprising ruthenium on a support."

Claim 34 reads:

"A process for impregnating porous microspheroidal particles with one or more salts of Group I, Group II, lanthanide and transition metals which process comprises blending the particles with one or more

solid salts of Group I, Group II, lanthanide and transition metals in the presence of a solvent for the salt in which the solvent is contained within the pore volume of the support particle."

- II. With a communication dated 8 October 2003, the European Patent Office (EPO), in its capacity as International Preliminary Examination Authority (IPEA), issued an invitation under PCT Rule 68.2 to restrict the claims or to pay two additional fees since the international application contained three inventions so that the requirements of unity as laid down in PCT Rules 13.1, 13.2 and 13.3) were not met.

In its invitation the IPEA argued that there were three separate groups of invention formed by claims 1 to 29, claims 30 to 33 and claims 34 to 38. Regarding the first invention, formed by claims 1 to 29, claim 1 contained all the features of claim 15 and was therefore considered to be dependent on that claim. The first invention concerned a process for impregnating microspheroidal catalyst support particles. The second invention, claims 30 to 33, concerned a process for the purification of a waste stream comprising dilute hydrazine and the third invention, claims 34 to 38, a process for impregnating porous microspheroidal particles.

According to the IPEA, the corresponding technical feature between those three groups was a (catalytically active) component on a support, which feature was known from D1 (GB-A-1 314 225). The corresponding technical feature between the groups of claims 1 to 29 and 34 to 38 was a process for impregnating microspheroidal

particles with at least one compound, which feature was known from D2 (GB-A-1 266 623). Therefore, the corresponding technical feature was not special.

The IPEA stated that the problems underlying the three groups of claims were to provide a further process for impregnating microspheroidal support particles with at least one compound of a catalytically active group VIII noble metal by the incipient wetness technique, to provide a further process for the purification of a dilute aqueous hydrazine comprising waste stream and to provide a further process for impregnating microspheroidal support particles with one or more salts, whereby the solvent is contained within the pore volume of the support particle, respectively. Therefore, the problem to be solved by each of the groups of claims had nothing in common that could serve as the general inventive concept. Moreover, D2 disclosed the impregnation of microspheroidal particles by the incipient wetness technique. Finally, the IPEA held that no other common problem could be found which could serve as the general inventive concept.

III. The applicant paid the two additional fees on 28 October 2003. The payment of the additional fee for Claims 30 to 33 was accepted, but the payment of the additional fee for Claims 34 to 38 was paid under protest.

The applicant argued that the special technical feature present in both of the groups of claims was the size, of the order of nanometers, of the particles. The particles mentioned in the cited prior art were of the order of a thousand times larger than those according

to the present application, which were indicated in the claims as microspheroidal particles. Therefore, the claims fulfilled the requirements of unity of invention as required by Rule 13.2 PCT.

- IV. The IPEA, pursuant to Rule 68.3(c) PCT, issued a communication dated 5 December 2003 informing the applicant that, after a prior review of the justification for the invitation to pay the additional fee, the requirement of that payment was upheld. Therefore, the Applicant was invited to pay the protest fee (Rule 68.3 (e) PCT).

The reasons given in the communication of the review panel were based upon the observation that the claims under investigation contained no definition for "microspheroidal" particles. Referring to the description, the review panel interpreted the term so that at least 80%, or, preferably, at least 90% of the particles should have a mean diameter of less than about 300  $\mu\text{m}$ . Since D2 disclosed fluid bed catalyst support particles of between 100 and 200  $\mu\text{m}$ , the particle size could not serve as a common feature distinguishing both groups of claims from the prior art.

- V. By letter dated 17 December 2003, received on 18 December 2003, the applicant (appellant) paid the protest fee.

## Reasons for the Decision

1. The protest is admissible.
2. According to claim 1, microspheroidal silica support particles are impregnated with an aqueous solution of palladium and gold compounds by the incipient wetness technique. After reduction of the Pd and Au compounds to their respective metals and filtering and washing procedures, the thus formed cake is impregnated with one or more salts of Group I, Group II, lanthanide and transition metals by blending it with one or more solid salts of those metals.

Claim 15 describes impregnating microspheroidal support particles by the incipient wetness technique with an aqueous solution of at least one catalytically active group VIII noble metal, followed by a drying step.

Therefore, apart from the possible use of an Au compound, which is not a Group VIII noble metal, claim 1 contains several features that specify details of the process steps of claim 15: the microspheroidal particles should be silica particles, the metal salts should be reduced to their metals and then the particles should be blended with solid salts of Group I, Group II, lanthanide and transition metals. Therefore, claim 15 is to be seen as the broadest claim of the group of claims 1 to 29.

Consequently, the question to be answered is whether claim 15 and claim 34 are so linked as to form one single general inventive concept.



2.1 Claim 34 is directed to blending porous microspheroidal particles with solid salts of Group I, Group II, lanthanide and transition metals in the presence of a solvent that is contained within the pore volume of the particles.

The applicant saw the nanometer size of the microspheroidal particles, compared to the micrometer size of the prior art particles, as the one single general concept linking together the two groups of claims.

2.1.1 D2, Example 2, discloses silicic acid carrier particles between 0.1 and 0.2 mm, i.e. 100 to 200 micron, which are kneaded with a solution containing Pd and Au metal ions. The solution contains a quantity of water just sufficient to permit absorption thereof by the silicic acid carrier. This had also been pointed out in the invitation under Rule 68.2 PCT.

Hence, D2 discloses the preparation of support particles in the micrometer range. The question that remains to be answered is whether those particles fall under the term "microspheroidal".

2.1.2 In the present claims no definition is given of the meaning of "microspheroidal" support particles. The appellant, referring to page 4, lines 23 to 25 of the description, argued that the microspheroidal particles of the application in suit had a mean diameter of the order of nanometers and were therefore much smaller than those of the prior art (letter dated 28 October 2003, page 1, last paragraph).

According to the description, page 3, lines 14 to 24, at least 80% and preferably at least 90% of suitable support particles typically have mean diameters of less than about 300 microns. A typical catalyst may have a particle size distribution of 0 to 20 microns (0-30 wt%), 20 to 44 microns (0-60 wt%), 44 to 88 microns (10-80 wt%), 88 to 106 microns (0-80 wt%), >106 microns (0-40 wt%) and >300 microns (0-5 wt%). Therefore, according to the description, the diameter of suitable particles is in the order of microns (micrometers) rather than nanometers.

2.1.3 The passage on page 4, lines 23 to 25, of the description to which the appellant refers, concerns part of the preparation of support particles. The complete passage runs from page 4, line 10 to page 5, line 1. It describes how in typically useful support particles, especially silica support particles, microspheroidal particles are produced by spray drying a mixture of silica sol with silica particles, followed by drying and calcining (page 4, lines 10 to 13).

Typical particulate silica materials are aggregates (with mean diameters of several hundred nm) of individual particles with average diameters of about 10 nm (above 7 nm) (page 4, lines 15 to 19).

The silica sol contains particles with a mean diameter of more than 20 nm and may be up to 100 nm or more. Preference is given to 40 to 80 nm (page 4, lines 26 to 29).

Hence, in order to prepare particles suitable for the purposes of the application in suit - which are therefore microspheroidal -, a silica sol containing particles of the preferred order of 40 to 80 nm is mixed with particulate silica of aggregates of several hundred nm, spray dried, dried and calcined.

2.1.4 The passage on page 4 only describes the sizes of the particles of the starting materials from which the microspheroidal support particles are made, but it contains no indication of the final diameter of the microspheroidal support particles so prepared. In view of the preparation method, it is nevertheless unlikely that the final support particles would also be in the nanometer range of the starting materials. Also the examples, in which is only stated that "silica support" was impregnated, are completely silent on that point. On the other hand, the passage on page 3, lines 14 to 24 of the description clearly mentions support particles of the order of micrometers.

For those reasons, it must be concluded that the term "microspheroidal" particles does not inevitably mean particles in the nanometer range and that the wording of claims 15 and 34 includes the use of particles in the micrometer range.

2.1.5 In view of the above, the particles used in D2, Example 2, which are between 100 and 200 micron in size, can be regarded as suitable particles for the purpose of present claims 15 and 34 or, in other words, as "microspheroidal" support particles, so that the single general concept of those claims was already known from the prior art. Therefore, the Applicant's submission

based on the particle size fails to establish unity of invention for the present international application. The reasoning in the invitation under Rule 68.2 PCT is correct.

2.2 For the foregoing reasons, the Board comes to the conclusion that the inventions according to the group of claims 1 to 29 and the group of claims 34 to 38 are not part of a single general inventive concept and, consequently, that the invitation made under Rule 68.2 PCT to pay an additional fee was justified.

## **Order**

### **For these reasons it is decided that:**

The protest is dismissed.

The Registrar:

The Chairman:

C. Eickhoff

B. Struif