Intellectual Property Office

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PATENTS ACT 1977

APPLICANT	Jemmtec Limited
ISSUE	Whether application GB2019063.3 complies with Section 1(1) and 14(5)(b) of the Patents Act 1977 (as Amended)
HEARING OFFICER	Stephen Brown

DECISION

1 Patent application GB2019063.3, entitled “PACKING MEMBER”, was filed on 3rd December 2020 in the name of Jemmtec Limited (‘The applicants’), without a claim to any earlier priority date.

2 There have been multiple rounds of correspondence between the applicants and the examiner. The most recent examination report, dated 5th November 2025, raised objections under inventive step, as well as a clarity, and stated that the application would be forwarded to a Hearing Officer for consideration.

3 The S20 period for this application was 3rd June 2025, and it has been extended on two occasions. The extended S20 period has passed on 3rd October 2025.

4 The applicant’s most recent letter, dated 19 November 2025, requested that a decision should be made on the papers, and referred to a main request with reasoning. Additionally (as a precautionary measure), three auxiliary requests were also filed.

The Application

5 The application relates to packing members for packed beds, in particular to supports for catalysts. More particularly, the invention relates to ceramic catalyst supports for use in processes such as the steam reforming and the production of direct-reduced iron. In particular, the invention relates to a combination of features in a ceramic packing member that leads to improved performance when used in the production of alkylene oxide.

6 The inventors have found that a particular combination of features in a ceramic packing member led to improved performance when used in the production of alkylene oxide. It is thought that the absence of a through hole in combination with other features, leads to increased strength while also increasing surface area and flow speed, enabling the packing member to direct flow over the catalyst surface and provide a more uniform flow. Furthermore, the packing members are said to provide highly porous supports whilst still providing strength.

7 As noted above, the applicants have proposed four alternative versions of claims, termed as the "main request", and 1st to 3rd "auxiliary" requests, to be considered in chronological order, should either preceding request not be found to meet the requirements of the Act. I shall consider the main request first, and then refer to the "auxiliary" requests, should it be necessary.

Main request

The main request was filed on 3rd October 2025 (before the extended S20 deadline expired), and comprises three independent claims (claims 1, 25, and 26) directed towards the *use of a packing member in a packed bed reactor in production of alkylene oxide*, *a reactor for producing alkylene oxide*, and a *method for production of alkylene oxide*. Specifically, the independent claims read as follows:

Claim 1

Use of a packing member in a packed bed reactor in the production of alkylene oxide, wherein the packing member comprises ceramic material and further comprises surface structures on the outer surface of the packing member, and wherein

the packing member does not comprise a fluid communication intra-particle channel extending through the packing member from a first aperture on a first side of the packing member to a second aperture on a substantially opposing second side of the packing member, wherein

the packing member has a porosity of ≥0.15cm3 /g, wherein

the surface structures represent a non-microscopic deviation of the shape of the outer surface of the packing member from the shape that would be expected based on the macrostructure of the packing member.

Claim 25

A reactor for producing alkylene oxide comprising a catalyst bed wherein the catalyst bed comprises a packing member, wherein the packing member comprises ceramic material and further comprises surface structures on the outer surface of the packing member, and wherein

the packing member does not comprise a fluid communication intra-particle channel extending through the packing member from a first aperture on a first side of the packing member to a second aperture on a substantially opposing second side of the packing member, wherein

the packing member has a porosity of ≥0.15cm3 /g, wherein

the surface structures represent a non-microscopic deviation of the shape of the outer surface of the packing member from the shape that would be expected based on the macrostructure of the packing member.

Claim 26

A method for the production of alkylene oxide comprising the use of a reactor comprising a catalyst bed wherein the catalyst bed comprises a packing member to produce an alkylene oxide, wherein the packing member comprises ceramic material and further comprises surface structures on the outer surface of the packing member, and wherein

the packing member does not comprise a fluid communication intra-particle channel extending through the packing member from a first aperture on a first side of the packing member to a second aperture on a substantially opposing second side of the packing member, wherein

the packing member has a porosity of ≥0.15cm3 /g, wherein

the surface structures represent a non-microscopic deviation of the shape of the outer surface of the packing member from the shape that would be expected based on the macrostructure of the packing member.

8 I consider these three claims to be coterminous and to relate to a single invention as a matter of substance.

9 For brevity, I shall note that:

i) The 1st auxiliary request (also filed on 3rd October 2025), additionally limits the independent claims of the main request to require that *the packing member has a macrostructure that is substantially in the form of a sphere or an ellipsoid*;

ii) The 2nd auxiliary request (filed on 19th November 2025, i.e. after the extended S20 period has expired), alternatively limits the independent claims of the main request to require that *the packing member comprises*

a plurality of repeating surface structures having substantially the same appearance; and

iii) The 3rd auxiliary request (also filed on 19th November 2025, i.e. after the extended S20 period has expired), proposes a combination of the above two alternatives, i.e. limits the independent claims of the main request to require both that *the packing member has a macrostructure that is substantially in the form of a sphere or an ellipsoid* (as proposed by the 1st auxiliary request) and also additionally that *the packing member comprises a plurality of repeating surface structures having substantially the same appearance* (as proposed by the 2nd auxiliary request).

The law

10 Section 1(1) of the Act reads:

> *A patent may be granted only for an invention in respect of which the following conditions are satisfied, that is to say*
> *(a) the invention is new;*
> *(b) it involves an inventive step;*
> *(c) it is capable of industrial application;*
> *(d) the grant of a patent for it is not excluded by subsections (2) and (3) or section 4A below; and references in this Act to a patentable invention shall be construed accordingly*

11 Sec. 3 of the Act goes on to say:

> *An invention shall be taken to involve an inventive step if it is not obvious to a person skilled in the art, having regard to any matter which forms part of the state of the art by virtue only of section 2(2) above (and disregarding section 2(3) above).*

12 Sec. 2(2) of the Act states that:

> *The state of the art in the case of an invention shall be taken to comprise all matter (whether a product, a process, information about either, or anything else) which has at any time before the priority date of that invention been made available to the public (whether in the United Kingdom or elsewhere) by written or oral description, by use or in any other way.*

13 The specific process to assess inventive step was set-out by the Court of Appeal in *Windsurfing*[1] in which the court formulated a four step process. This process was re-formulated by Jacob LJ in the Court of Appeal decision of *Pozzoli*[2] as follows:

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[1] *Windsurfing International Inc. v Tabur Marine (Great Britain) Ltd, [1985] RPC 59*
[2] *Pozzoli SPA v BDMO SA [2007] EWCA Civ 588*

(1)(a) Identify the notional "person skilled in the art"

(1)(b) Identify the relevant common general knowledge of that person;

(2) Identify the inventive concept of the claim in question or if that cannot readily be done, construe it;

(3) Identify what, if any, differences exist between the matter cited as forming part of the "state of the art" and the inventive concept of the claim or the claim as construed;

(4) Viewed without any knowledge of the alleged invention as claimed, do those differences constitute steps which would have been obvious to the person skilled in the art or do they require any degree of invention?

14 Sec. 14(5) of the Act states that:

(5) The claim or claims shall—

(a) define the matter for which the applicant seeks protection;

(b) be clear and concise;

(c) be supported by the description; and

(d) relate to one invention or to a group of inventions which are so linked as to form a single inventive concept.

15 Sec. 125(1) of the Act states that:

For the purposes of this Act an invention … for which an application has been made … unless the context otherwise requires, be taken to be that specified in a claim of the specification of the application or patent, as the case may be, as interpreted by the description and any drawings contained in that specification, and the extent of the protection conferred by a patent or application for a patent shall be determined accordingly.

Analysis

Clarity and claim construction

16 The latest pre-hearing report issued by the examiner on 5 November 2025 outlines objections under Sections 1(1)(b) (i.e. requirement for Inventive step) and 14(5)(b) (i.e. requirement for Clarity). I am of the view that the clarity objection stems from how the claim is construed. Given that consideration of inventive step also requires considering how the claim must be construed, I will consider this point first.

17 Specifically, the examiner has objected to the term "*surface structures*" to be unclear since issuing their first examination report on 23rd January 2024, and consistently maintained this objection. For their part, the applicants, have consistently maintained that this term is clear. Both the examiner and the applicants have proposed extensive analysis in support of their reasoning, and an impasse has been reached on the points of both how this term should be construed, and whether or not it complies with the requirement of Section 14(5)(b) of the Act for the claim(s) to be clear.

18 In their pre-hearing report of 5th November 2025, the examiner, having given careful consideration to the applicants's reasoning, proposes that the term "*surface structures*" lacks clarity, and suggests that: "*The skilled person when reading the specification, examining the drawings and the prior art naturally come to the conclusion that structures such as the lobes of a multi lobed pellet, castellations on a cog or indentations on a sphere are all surface structures*".

19 In their letter of 19th November 2025, see page 8 for example, the applicants provide an extensive analysis of why this should not be considered to be the case (which I will refer to in more depth in the inventive step section of this decision).

20 I note that claims are required to 'define the matter for which the applicants seek protection' by S14(5)(a), and be clear by S14(5)(b), but the applicants draft the application, including the claim(s), "*in wording of their own choosing*", as noted in paragraph 34 of *Kirin-Amgen*[3]*.*

21 Section 125(1) of the Act requires that the wording of the claim(s) should then be interpreted in view of the description and any drawings contained in the specification.

22 Therefore, when considering how the term "*surface structures*" contained in the claims should be construed, it is necessary to consider how the skilled reader would construe it in view of the accompanying description and drawings. As noted in the Manual of Patent Practice paragraph 3.20, to a large degree the capacities of the skilled person will be determined by the nature of the common general knowledge identified as being "relevant". An important consequence of imparting to this person the relevant common general knowledge is that they will generally not be aware of individual patent specifications, scientific papers, or the like.

23 With this in view, I must turn to description and drawings to decide how a skilled reader would construe the chosen wording of the claims as drafted, in particular the wording "*surface structures*".

24 With reference to description as originally filed, the specification draws a clear distinction between a macrostructure of a packing member and surface structures "on the outer face of the macrostructure" (see paragraph 12). Paragraph 25, outlines

[3] *Kirin-Amgen Inc v Hoechst Marion Roussel Ltd [2005] RPC 9, 169.*

that by “surface structures” it is meant structures that represent a deviation of the shape of the outer surface of the packing member from the shape that would be expected based on the macrostructure of the packing member. Specifically, the surface structures may be considered to be surface texturing on the macrostructure of the packing member. It will be understood that such “surface structures” in the context of the present invention do not include microscopic surface roughness. Paragraph 27, in particular, explicitly states that normal features of macrostructures such as the “castellations of a cog” or the “lobes of multilobe” are considered to be part of the macrostructure and are not considered to be surface structures according to the present invention. Paragraph 33 exemplifies that a “surface structure” may in the form of a “ridge, trough, mound and/or depression”. Paragraphs 50, and 82 exemplify how surface structures of the packing member may be formed. Detailed description of embodiments (page 18 onwards) describe how the outer surface of packing member 200 additionally comprises surface structures 206 (see paragraph 121 with reference to figure 2, for example).

25 Claim 1 requires a packing member comprising surface structures on the outer surface of the packing member, and wherein the surface structures represent a **non-microscopic deviation of the shape of the outer surface of the packing member from the shape that would be expected based on the macrostructure** of the packing member.

26 Dependent claim 3 further stipulates that in an optional arrangement, the packing member has a macrostructure that is substantially in the form of a multi-lobe, for example a cog. Therefore, it is considered that a skilled reader would not consider peaks and troughs of a cog to form “surface structures” within the meaning conferred by accompanying description and drawings, but rather they would be construed as a part of the shape “expected based on the macrostructure” of the packing member.

27 In light of all of this, I believe that the skilled person would find the term “*surface structures*” to be sufficiently clear in their given context, and therefore I am happy that the claims satisfy Section 14(5)(b) of the Act.

Inventive Step

28 The examiner cited multiple citations, many of which have been overcome by the amendments and/or reasoning supplied by the applicants. The final pre-hearing report of 5th November 2025 though maintained two of those citations. For consistency, I will maintain the reference numbers used in that, and earlier, reports. The citations to be considered are:

D6	*GB 2577054 A*	*(JEMMTEC LTD); and*
D9	*US 2017/0189875 A1*	*(VON et al)*

29 I will now apply the steps of the Windsurfing/Pozzoli[2] test. For ease of reference, I will repeat the steps here:

> *(1)(a) Identify the notional "person skilled in the art"*
>
> *(1)(b) Identify the relevant common general knowledge of that person;*
>
> *(2) Identify the inventive concept of the claim in question or if that cannot readily be done, construe it;*
>
> *(3) Identify what, if any, differences exist between the matter cited as forming part of the "state of the art" and the inventive concept of the claim or the claim as construed;*
>
> *(4) Viewed without any knowledge of the alleged invention as claimed, do those differences constitute steps which would have been obvious to the person skilled in the art or do they require any degree of invention?*

30 Steps 1a,1b and 2 are not dependent upon which document is considered to represent the 'state of the art' and so I will carry them out first before assessing steps 3 and 4 for each document in turn.

(1)(a) Identify the notional "person skilled in the art"

31 There is no disagreement between the examiner and the applicants on step 1a. It is accepted that a suitable person skilled in the art is an industrial chemist who works with packed bed reactors, particularly those used for the production of alkylene oxide. I agree.

(1)(b) Identify the relevant common general knowledge of that person

32 With regards to step 1b, the examiner, in their pre-hearing report of 5th November 2025, accepts the applicant's view that the common general knowledge would include knowledge of packed bed reactor types, including packing members, and the associated problems with commercially available systems. The examiner adds that this would include knowing that porosity is desirable in the packing members of a packed bed reactor to increase surface area and thus catalytic activity and reaction rate.

33 In their letter of 19th November 2025, the applicants disagree with this identification on several accounts. In particular, they note that the common subject matter includes knowledge of "common" packed bed reactor types, including "common" packing members, and the associated problems with "common" commercially available systems, which may include generally cylindrical, extrusion formed, packing members having one or more channels extending through the packing member. I agree with these points.

34 The applicants then expressly disagree with the examiner's view that common general knowledge also includes knowing that porosity is a desired feature, positively influencing catalytic activity and reaction rate, for at least two reasons.

35 Firstly, the applicants argue that the skilled person would be aware that a number of factors influence catalytic activity and reaction rate, such as the reaction conditions, mass transfer and the reaction mechanisms. Further, they argue that the skilled person is generally aware that porosity can in some cases result in lower catalytic activity and reaction rates, such as when porosity increases tortuosity (providing longer diffusion pathways), reduces surface area (due to larger pores and less support mass, resulting in lower bulk density and also resulting in fragile supports), and reduced catalyst dispersion (larger pores creating agglomerated catalyst sites). Therefore, the applicants state that catalytic systems in general are not as simplistic as the examiner suggests.

36 Secondly, they also argue that there are a number of parameters and features that influence catalytic activity and reaction rate. Such influence can be positive or negative depending on the specific and unique combinations used in a particular reaction type with particular conditions, reactants, and catalysts. Again, they argue that it is not as simplistic as suggested by the examiner. They conclude that it cannot be assumed that the skilled person would always desire higher porosity in a catalyst support.

37 I am minded to accept these arguments, and I will therefore give the applicants the benefit of the doubt on this point. I thus decide that the common general knowledge of the skilled person would include: *knowledge of common packed bed reactor types, including common packing members, and the associated problems with common commercially available systems, which may include generally cylindrical, extrusion formed, packing members having one or more channels extending through the packing member.*

(2) Identify the inventive concept of the claim in question or if that cannot readily be done, construe it

38 In their pre-hearing report of 5th November 2025, the examiner identified the inventive concept to be: *A packing member which comprises ceramic material, has porosity of ≥0.15cm^3/g and surface structures on its outer surface which are non-microscopic deviations from the shape expected based on the macrostructure of the packing member and where the packing member does not comprise any through channels wherein the packing member is used in a packed bed reactor to produce alkylene oxide (claims 1 & 26) or is in a reactor suitable for producing alkylene oxide (claim 25).*

39 In their letter of 19th November 2025, the applicants appear to be generally content with this interpretation, offering a more brief summary of claim 1, which is said to set out the specific use of a porous ceramic packing member comprising surface structures on its outer surface in combination with the absence of a fluid communication intra-particle channel extending therethrough and with a porosity of ≥0.15cm^3/g.

40 I cannot see any difference, in substance, between what is being proposed by the examiner and the applicants. Thus, I will adopt the inventive concept laid out in paragraph 38, above.

(3) Identify what, if any, differences exist between the matter cited as forming part of the "state of the art" and the inventive concept of the claim or the claim as construed;

(4) Viewed without any knowledge of the alleged invention as claimed, do those differences constitute steps which would have been obvious to the person skilled in the art or do they require any degree of invention?

D6: GB 2577054 A

41 GB 2577054 A (D6) is an earlier application by the same applicants. I shall henceforth refer to it as D6 for brevity.

Surface structures which are non-microscopic deviations from the shape expected based on the macrostructure

42 In their final pre-hearing report of 5th November 2025, the examiner considers that D6 teaches spherical beads with suitable surface structures comprising grooves around the perimeter and dimples. The applicants do not appear to disagree that D6 teaches surface structures *per se*. In fact, their letter of 19th November 2025 explicitly quotes paragraphs from document D6, which refer to *surface structures per verbatim* in e.g. paragraphs 99, 101-104, 108. I agree that this requirement of claim 1 is disclosed in D6.

The absence of a fluid communication intra-particle channel extending therethrough

43 In their letter of 19th November 2025, the applicants argue that D6 should not be taken to disclose this feature. They point to the fact that the *general teaching* of D6 is that at the presence of at least one bore is advantageous, and preferably more than one bore should be considered. In other words, the skilled person, when reading D6 is heavily signposted away from what claim 1 of the present application requires, and therefore wouldn't consider the arrangement required by claim 1. For their part, the examiner, in their pre-hearing report of 5th November 2025, points towards paragraph 22 of D6, which nonetheless says:

> *[22] The macrostructure may be a monolith **or** comprise one or more bores extending through the macrostructure. Preferably, the packing member comprises at least one bore extending through the macrostructure, more preferably, the macrostructure comprises at least three bores. The macrostructure may be a honeycomb structure. The bores of the macrostructure may be straight cut or faceted.*

44 The skilled person, when reading D6, would understand this to amount to an explicit disclosure that the bore is optional, and is therefore not required. On this point, I agree with the examiner. In my view, no matter how preferable the presence of a bore may be described as being in D6, and what the majority of the description

points towards as being advantageous, document (D6) nonetheless very clearly discloses an arrangement of a macrostructure with an absence of a fluid communication intra-particle channel extending therethrough. I therefore consider D6 to disclose this requirement of claim 1.

Porosity of ≥0.15cm^3/g

45 In their letter of 19th November 2025, the examiner notes that paragraph 7 of D6 teaches that the beads may have a porosity of "at least 20%". Further, paragraph 14 teaches that a porosity of "15 to 50%" is possible. I also note that Paragraph 15 of D6 confirms the porosity is measured using the same methodology as used in the present invention (see paragraph 46 of description).

46 The applicants, for their part, have not disputed these disclosures. While these porosities are not expressed in the same units as those used in the current application, to my mind they do teach that higher levels may be preferable. I thus conclude that starting with document D6, the skilled person would consider trying various porosities, including the range defined in the current claims. I thus conclude that D6 renders this feature obvious.

Use of the packing member in the production of alkylene oxide

47 In their pre-hearing report of 5th November, the examiner conceded that D6 does not teach the use of its packing member *in the production of alkylene oxide*. The applicants agree with this point and so do I.

48 However, the examiner did observe that D6 does disclose using its packing members in '*reactors… for the production of synthetic gas, … direct reduction of iron… endothermic gas generation, catalytic partial oxidation; or autothermal reforming*'. The examiner further reasoned that other parts of D6, such as paragraph 6 are much more general and directed to a packing member *per se* for use in packed bed reactors, with no restriction on the reaction that the packing member is used for. Relying on the more generalised discussion in e.g. paragraphs 65, 66 and 70 of D6, the examiner argued that the person skilled in the art of the production of alkylene oxide would realise (starting from D6 combined with their common general knowledge) that the packing members disclosed in D6 *could be* used in the production of alkylene oxide, and that paragraph 70 in particular even discloses silver as a catalyst material (which they note appears to be commonly used in alkylene oxide production). As a consequence they argued that it was obvious to arrive at the arrangement required by claim 1 of the main request when starting from D6.

49 On this point, I will observe that the question to answer is not whether the skilled person *could* arrive at the arrangement required by claim 1, but rather whether they *would* arrive at that arrangement without exercising *any degree of invention*.

50 In their letter of 19th November 2025, the applicants go into a very detailed argument, explaining in depth why, in their view, the skilled person would not. In fact, many examples in support of this reasoning are provided by the applicants, which may be broadly summarised to note that D6 has no indication that the packing member disclosed therein could be used in alkylene oxide production, nor that it would even

be suitable for doing so, and starting from D6 the skilled person would need to make unaided and untaught decisions to not choose the use of the packing member in one of the taught reactions such as production of syngas, but to instead chose a reaction (from hundreds if not thousands) of possible reaction types, with no motivation to do so, and no indication of the associated improvements. The applicants argue that looking for similarities alone between production of syngas and alkylene oxide amounts to an oversimplification, because there exist many fundamental differences.

51 In particular, the applicants propose that many features and properties of the packing member would need to be considered for alteration, such as geometry, size, porosity, surface area, mechanical strength, durability, etc, and also that the processes of syngas and alkylene oxide production differ significantly in reaction conditions, including different temperatures (700-1000 degrees Celsius vs 200-300 degrees Celsius), different pressures (high versus moderate), as well as different reaction pathways followed in each process (with syngas demonstrating an endothermic reaction profile, while alkylene oxide production demonstrating an exothermic reaction profile). The two processes, the applicants continue, would employ different reactants and products, and thus naturally might use different catalyst types to facilitate the reactions. Thus, the applicants argue, the skilled person would not consider using the packing members disclosed in D6 in the production of alkylene oxide.

52 Again, I am inclined to give the applicants the benefit of the doubt and agree with their reasoning. Thus, viewed without any knowledge of the alleged invention as claimed, I do not consider that the skilled person would have found it obvious to use the packing members disclosed in D6 for the production of alkylene oxide. I thus decide that the independent claims of the main request are inventive over D6.

53 For completeness, I will briefly address claim 25 which only requires: A reactor *suitable* for producing alkylene oxide comprising packing members having the above defined features. While this is a somewhat weaker limitation than the other independent claims, I do not consider that the skilled person would find it obvious to try the packing members of D6 in such a reactor. Thus, this claim is also inventive over D6.

D9: US 2017/0189875 A1

54 I shall now consider the remaining citation, US 2017/0189875 A1

The absence of a fluid communication intra-particle channel extending therethrough and with

55 In their final pre-hearing report of 5th November 2025, the examiner notes that D9 discloses a packing member that is solid with no through hole bore (see figure 2A in contrast to figure 2B). This point does not appear to be disputed by the applicants. I also agree that this limitation is disclosed in D9.

Use of the packing member in the production of alkylene oxide

In their pre-hearing report of 5th November 2025, the examiner notes that D9 discloses a packing member that is used in the production of alkylene oxides (see paragraph 83 of D9 referring specifically to *ethylene oxide*). Again, this point does not appear to be disputed by the applicants. I also agree that this limitation is disclosed in D9.

Porosity of ≥0.15cm3/g

56 In their pre-hearing report of 5th November 2025, the examiner notes that D9 discloses packing members comprised of porous ceramics. The examiner notes that while there is no explicit disclose of a value for this porosity they consider that the skilled person *would* find the porosity of claim 1 to be obvious in light of D9 (when combined with common general knowledge). In support of this, the examiner refers to paragraph 28 of D9 listing ceramic materials, such as alumina, silica, titanium dioxide, calcium carbonate, barium sulphate, zeolite, cerium oxide, magnesium oxide, or zinc oxide, which they note are commonly porous materials, while also observing that D9 teaches the benefit of using porous materials in paragraph 66.

57 They conclude that the claimed porosity of ≥0.15cm^3/g is not unusually high, and that the skilled person would find it obvious that the materials in D9 could have a porosity in that range. To back up this reasoning, the examiner cites the background art document: *Galanakis et al, Effect of pressure and temperature on alcoholic fermentation by Saccharomyces cerevisiae immobilised on y-alumina pellets, Bioresource Technology 114 (2012) 492-298.*

58 Section 2.1 of this document discusses extruded alumina pellets with a pore volume of 0.7cm^3/g. The examiner argues that similar porosities are widely demonstrated in the art and that the skilled person would recognise that high porosity is a desired property that D9 teaches towards.

59 In response, in their letter of 19th November 2025, the applicants argue that *Galanakis et al* provides no details as to the specific production steps for preparing y-alumina pellets, nor any details of the measurement technique used to determine pore volume. Furthermore, the applicants argue that any initial porosity in the material would not be maintained throughout processing, because processing by extrusion indicates that the porosity of the carrier would be very low since the mechanical pressing of the material through a die would collapse any internal cavities. The applicants also argue that even if the pellets described by *Galanakis* were prepared by the same method as the packing members of D9, it cannot be concluded that the pore volume would be comparable to the porosity of the present invention, which is measured by mercury intrusion porosimetry as described in paragraph 46 of the description as originally filed of the current application.

60 In my view, however, the examiner only refers to *Galanakis et al.* as a demonstration that a porosity of 0.7cm3/g is known in the art, and that this information *per se* would form part of the skilled person's common general knowledge.

61 I also note that D9 teaches the use of porous ceramic materials, as well as teaching that higher porosity is advantageous. Combining this teaching with the common general knowledge exemplified in *Galanakis et al.,* I conclude that starting with document D9, the skilled person would consider trying various porosities, including

the range defined in the current claims. I thus conclude that D9 renders this feature obvious.

Surface structures which are non-microscopic deviations from the shape expected based on the macrostructure

62 In their pre-hearing report of 5th November 2025, the examiner refers to figures 5A and 5B of D9, arguing that these figures show 'recesses' between lobes that deviate from the macroscopic circular cross-section.

63 However, in their letter of 19th November 2025, the applicants argue that this manner of construing the claim does not align with the way the skilled person would interpret the claim.

64 As reasoned above in the clarity section of this decision, I agree with the applicants on this point. In my opinion, the shapes illustrated in figures 5A & 5B *are* the macrostructures. For example, in figure 5A the "pentalobe" shape is the macrostructure, and the recesses between the lobes cannot be construed as surface structures. As reasoned above, construing this feature in light of the description as a whole, makes this conclusion clear.

65 Somewhat more convincingly, the examiner also argued that figure 2A shows a cylindrical macrostructure 200 with a single trench or groove, 210, rotated by an angle along the body length. They argued that this feature was the required "surface structure".

66 The applicants have not specifically commented on the significance of figure 2A of D9. However, page 8 of their letter of 19th November 2025, does state that: "…*one skilled in the art would not consider structures such as… grooves in a sphere to be deviations from the expected macrostructure. Instead, such structures would be considered as part of the macrostructure itself, such that no deviations are present. This reasoning is further supported by the description as filed, such as… in paragraph [20] which describes that the macrostructure of a spherical/ellipsoidal packing member comprising a groove on the outer face would be considered to be a grooved sphere or ellipsoid. The skilled person would know the standard structures of packing members in the art… and would also know the difference between the macrostructure (comprising… grooves) and surface structures. It is submitted that the presence of surface structures on a packing member would be readily apparent to the skilled person, irrespective of the macrostructure of the packing member. In view of the above, any such… grooves in a packing member would be considered by one skilled in the art as making up part of the macrostructure and would therefore not be included in the definition of surface structures".*

67 Again, I am minded to accept the applicants arguments. Not least because I am bound to construe the claims in light of the description and that makes it clear that, with e.g. a grooved sphere the sphere plus the groove should be construed as the macrostructure. Specifically, I believe that the surface structures should be considered akin to non-microscopic surface texturing on the macrostructure of the packing member.

68 I thus conclude that a skilled reader would not consider the groove 210, illustrated in figure 2A, to form a “surface structure” within the meaning required by the claims of the current application, as construed. Consequently, I can see nothing in D9 teaching towards the required ‘surface structures’. I thus decide that the independent claims of the main request are inventive over D9.

69 While all the required features are either disclosed, or rendered obvious, between the two disclosures of D6 and D9 I can see nothing linking the two documents that would make it obvious for the skilled person to combine their teachings. Such an approach would, I believe, go against the precedent I must follow in Windsurfing/Pozzoli[2].

70 Finally, as I have decided that the claims of the main request are inventive in light of the citations, I do not need to consider any of the auxiliary requests.

Compliance period

71 The compliance period for this application expired on 3rd October 2025 after two extensions. However, the claims which I have decided are clear and inventive were present on file at that date, so if the examiner has no other objections, and I have not been asked to consider any others, then it is likely that the application would have been in order at that time.

72 Alternatively, if there remain some outstanding issues, it is unfortunately too late for the applicants to further extend the compliance period to address them. As part (7) of rule 108 applies in this case, I regret that no further extension of the compliance period is possible.

Conclusion

73 Having decided that the claims are clear and inventive over the cited documents, I remit the application back to the examiner for further processing.

Appeal

74 Any appeal must be lodged within 28 days after the date of this decision.

STEPHEN BROWN

Patent Examination Group Head