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Datasheet for the decision of 4 March 2025

Case Number: T 1667/22 - 3.3.06

Application Number: 08732726.8

Publication Number: 2129518

IPC: B01J21/08, B01J21/12, B01J23/06, B01J37/02, C04B41/00, C09C1/40, C04B41/45, C09C1/28, C04B35/628, C04B20/10

Language of the proceedings: EN

Title of invention:
METAL COMPOUND COATED PARTICULATE MINERAL MATERIALS, METHODS OF MAKING THEM, AND USES THEREOF

Patent Proprietor:
Imerys Filtration Minerals, Inc.

Opponent:
OMYA International AG

Headword:
Imerys/coated perlite

Relevant legal provisions:
EPC Art. 56

Keyword:
Inventive step - (no)

Decisions cited:

Catchword:

Europäisches Patentamt
European Patent Office
Office européen des brevets

Beschwerdekammern

Boards of Appeal

Chambres de recours

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Case Number: T 1667/22 - 3.3.06

D E C I S I O N
of Technical Board of Appeal 3.3.06
of 4 March 2025

Appellant: (Opponent)	OMYA International AG Baslerstrasse 42 4665 Oftringen (CH)
Representative:	Maiwald GmbH Elisenhof Elisenstraße 3 80335 München (DE)
Respondent: (Patent Proprietor)	Imerys Filtration Minerals, Inc. 1732 North First Street Suite 450 San Jose, CA 95112 (US)
Representative:	Haseltine Lake Kempner LLP One Portwall Square Portwall Lane Bristol BS1 6BH (GB)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 30 May 2022 concerning maintenance of the European Patent No. 2129518 in amended form.**

Composition of the Board:

Chairman	J.-M. Schwaller
Members:	S. Arrojo
	O. Loizou

Summary of Facts and Submissions

I. An appeal was filed by the opponent against the decision of the opposition division to maintain European patent No. 2 129 518 in amended form on the basis of the claims according to auxiliary request 1 then on file, claim 1 thereof reading as follows:

"1. A metal silicate coated particulate mineral material, comprising perlite comprising a coating comprising at least one metal silicate, wherein the at least one metal silicate is an alumino silicate and wherein the perlite is in the form of microspheres."

II. In its statement of grounds of appeal, the appellant requested that the patent be revoked, arguing that the subject-matter of above claim 1 did not meet the requirements of Article 123(2) and 83 EPC, was not novel over **D4** (JP H 05221746), **D5** (CN 1232004 A) or **D6** (DE 2909652 A1), and did not involve an inventive step starting from D6 as the closest prior art.

III. In its reply, the patent proprietor and respondent requested that the appeal be dismissed and filed three sets of amended claims as auxiliary requests 1 to 3.

Claim 1 of **auxiliary request 1** corresponds to that of the main request, wherein perlite is further defined as being "*expanded perlite*".

Claim 1 of **auxiliary request 2** reads as follows:

"1. A metal silicate coated particulate mineral material, consisting of expanded perlite which is

coated with alumino silicate and wherein the expanded perlite is in the form of microspheres."

Claim 1 of **auxiliary request 3** reads as follows:

"1. A method of forming coated expanded perlite microspheres, comprising:
introducing perlite microspheres into an expander heated to a temperature of from 482°C (900°F) to 593°C (1100°F);
injecting into the expander at least one metal component and at least one silicate component; and,
allowing the perlite microspheres, the at least one metal component, and the at least one silicate component to reside in the expander for a time sufficient to coat the perlite microspheres with the at least one metal component and the at least one silicate component, wherein the at least one metal component and the at least one silicate component form at least one metal silicate and the at least one metal silicate is an alumino silicate."

IV. In its preliminary opinion, the board concluded that the invention as defined in the main, first and second auxiliary requests did not appear to satisfy the requirements of Article 56 EPC in view of the combined teachings of D6 and **D2** (Y. Sakka et al., Whiteness of Fine Hollow Microspheres Prepared from Vitric Volcanic Materials, J. Ceram. Soc. of Japan 2000, 108, 108-111). The conclusions on inventive step for auxiliary request 3 were left open.

V. In response to this opinion, both the opponent and the proprietor submitted additional arguments on 17 December 2024 and 28 February 2025, respectively. The proprietor also filed two additional documents labelled

D13 and D14. Although these labels had already been used for other documents, the board will retain them for the sake of simplicity.

VI. At the oral proceedings, which took place on 4 March 2025, the opponent requested that the new arguments and evidence in proprietor's submission of 28 February 2025 be disregarded under Article 13(2) RPBA. At the end of the hearing, the parties confirmed that the underlying decision should be based on the following requests:

The appellant requested that the decision under appeal be set aside and the patent be revoked.

The respondent requested that the appeal be dismissed (main request), or as an auxiliary measure, that the patent be maintained in amended form on the basis of one of auxiliary requests 1 to 3 filed with the reply to the appeal.

Reasons for the Decision

1. Main request - Inventive Step

The requirements of Article 56 EPC are not met for the following reasons:

1.1 Closest prior art

1.1.1 Document D6 discloses in its claim 1 a pearl-shaped particulate material consisting of a core made of expanded perlite coated with a glass and/or ceramic material. The glass or ceramic material coating may contain unexpanded perlite (i.e. an aluminosilicate) (see claim 2) or water glass with a silicate mineral

(see claim 9) such as waste glass and/or an aluminosilicate and/or perlite powder (see claim 10). Consequently, both the embodiments according to claim 2 and those according to 2 out of the 3 options in claim 10 anticipate the coating of the perlite with an aluminosilicate.

1.1.2 It has been a matter of discussion whether the term "microsphere" constitutes a distinguishing feature over D6. The board interprets this term to imply that the particles are approximately, though not perfectly, spherical and that they fall within the micron size range. This interpretation follows directly from the term "microsphere" itself, as well as from Figure 1 and paragraph [0025] of the patent.

1.1.3 The proprietor argued that the term "pearl-shaped" did not imply that the particles in D6 had a spherical morphology, as it encompassed a wide range of alternative shapes. Moreover, no evidence had been provided to establish that a pearl shape was equivalent to a spherical form. To support this argument, the proprietor submitted document D14, from which it could be deduced that most shapes associated with a pearl form were, in fact, non-spherical.

1.1.4 The Board disagrees therewith, as it is evident that within the present technical context both the terms "pearl-shaped" and "microspheres" provide an equally vague indication that the particle morphology is approximately spherical. While the proprietor correctly observes that "pearl-shaped" encompasses a wide range of forms, the term "microspheres" as used in the patent is subject to a comparable level of vagueness. If anything, the pearl-like shapes shown in the newly filed D14 appear closer to a perfect sphere than the

perlite microspheres depicted in Figure 1 of the patent or in Figure 4(f) of the newly submitted D13. Moreover, the board notes that D6 not only uses the term "pearl-shaped" to describe the particles' morphology, but also explicitly states (see page 9) that their "spherical shape" ("Kugelform") contributes to their toughness and mechanical resistance. The board therefore concludes that D6 clearly anticipates the spherical morphology of the perlite particles.

1.1.5 On the other hand, it is clear that document D6 does not specify the particle size. Therefore, the distinguishing feature of claim 1 over this document is that the particles are in the micron scale.

1.2 Problem solved by the underlying alleged invention

1.2.1 According to the patent (see para. [0009]), the object of the invention was to provide a particulate material with improved compressive strength, hardness and/or colour. In view of the examples of the patent and the results shown in Table 2 (see page 11), the addition of an aluminosilicate coating to the perlite particles increases the compaction resistance without significantly increasing the compaction density.

1.2.2 The proprietor argued that a key issue with perlite microsphere structures was their tendency to fracture, and as shown by the examples in the patent, this problem was solved by enhancing the strength of the particles through the aluminosilicate coating.

1.2.3 As stated in the board's preliminary opinion, the improvement in particle resistance demonstrated in the examples is attributed to the aluminosilicate coating, rather than to the micron-sized nature of the

particles, but this feature is not only disclosed in D6, but also explicitly linked in that document to an enhanced particle resistance (see "Erhöhung der Druckfestigkeit" on page 6 of D6).

1.2.4 The key question is therefore whether operating within the micron size range yields any specific technical effect. Although the patent does not appear to provide direct evidence in this respect it may be assumed, at least for the sake of argument, that particles of such a small size exhibit improved resistance compared to larger ones. Accordingly, the problem solved by the invention can be defined as the enhancement of the particles resistance.

1.3 Obviousness of the solution

1.3.1 Document D2 teaches at page 108, left column, that expanded perlite microspheres are often prone to breaking and that this issue can be mitigated by reducing their size to approximately 15 microns.

1.3.2 The proprietor argued that D6 did not provide any data regarding compaction density, resistance, or related properties. Moreover, it focused on improving the strength of foamed perlite with a thin coating in order to avoid significantly increasing their weight, so that there was no motivation to modify the size of the particles, as this aspect was not even mentioned in D6. The skilled person would therefore not contemplate alternative perlite particles in the form of microspheres, and there was also no reason to consult the teachings in D2, as this document neither relates to compaction resistance but to resistance to shearing forces nor concerns coated particles, but uncoated ones. The subject-matter of claim 1 at issue could thus

not be rendered obvious by D6 alone or in combination with D2.

1.3.3 The board agrees nevertheless with the opponent in that the assumptions made in point 1.2.4 above to formulate the problem necessarily rely on the idea that reducing particle size to enhance resistance is part of common general knowledge. That D6 does not refer to the particle size or proposes using a thin coating for improved resistance is deemed irrelevant, as a skilled person would necessarily have to choose a particle size when reproducing the perlite product described in D6, and the fact that D6 proposes a solution to the problem of increasing the resistance cannot be taken as a disincentive to look for further improvements in this respect.

1.3.4 Further, given that the term "micro" in "microspheres" is rather vague and simply denotes that the particles fall within the micron scale (covering from approximately 1 micron up to 1 mm), the board has concluded that a skilled person starting from D6 would have arrived at the claimed subject matter through the application of common knowledge and/or routine experimentation without the need for inventive skills.

1.3.5 The board has further concluded that the teachings of D2 provide an alternative route to arrive at the claimed subject matter without requiring inventive skills. The fact that D2 focuses on shear forces or that the particles therein do not include a coating does not prevent the skilled person from recognising that selecting particles within the micron scale (e.g. 15 microns) would enhance resistance to various types of forces compared to larger particles. As indicated above, the proposed size range is very broad and

encompasses values that a skilled person would consider by applying common knowledge or routine experimentation. The board thus concludes that the proposed solution is also rendered obvious by the teachings of D2.

1.3.6 The subject-matter of claim 1 is therefore obvious in view of D6 alone or in combination with the teachings in D2.

2. Auxiliary requests 1 and 2 - inventive step

2.1 Claim 1 of auxiliary request 1 specifies that the perlite is provided as "expanded perlite", and claim 1 of auxiliary request 2 further indicates that the particle core consists of expanded perlite.

2.2 Since document D6 explicitly discloses that the particulate material includes a core consisting of expanded perlite ("...aus aufgeschäumtem Perlit bestehenden Kern..." (see page 6)) coated with an aluminosilicate, the objections raised against the main request also apply to claim 1 according to auxiliary requests 1 and 2.

2.3 The requirements of Article 56 EPC are thus also not satisfied for these requests.

3. Auxiliary request 3 - inventive step

3.1 Claim 1 of this request defines a method of forming coated expanded perlite microspheres including a step of coating the particles with an aluminosilicate at a temperature of 482°C to 593°C.

3.2 Closest prior art

3.2.1 Document D6 is still regarded as the closest prior art and discloses an embodiment (see claim 7) in which the coating material is sprayed onto the particles at an elevated temperature of 800 to 1000°C.

3.2.2 The proprietor argued that claim 1 at issue differed from D6 not only in that the particle sizes were within the micron range (as in the main request) and in that the aluminosilicate coating was applied at a temperature between 482°C and 593°C, but also in that the temperature was controlled in the expander and the precursors of the aluminosilicate were provided separately.

3.2.3 Even though claim 1 does not explicitly require the metal component to be an aluminium precursor, it will be assumed for the sake of argument that this is the case. Consequently, claim 1 is considered to differ from D6 by the features identified by the proprietor.

3.3 Problem solved by the invention

3.3.1 According to the patent (para. [0041]), coating particles at an elevated temperature of 482 to 816°C facilitates precipitation and induces the formation of a hard ceramic coating. Furthermore, example 1 and Table 1 indicate that coating perlite particles at 482°C to 593°C enhances the compaction resistance without significantly increasing the compaction density. On the other hand, in examples 2 to 4 the same effect is observed when the perlite is coated at room temperatures.

3.3.2 The proprietor argued that even though the patent included different alternatives for coating the particles, in particular referring to different temperature ranges, example 1 was clearly representative of the process defined in claim 1 at issue. Since this example led to the desired effect of increasing the compaction resistance without significantly increasing the compaction density, it was apparent that the problem solved was to propose a way to achieve such improvement. The proprietor also noted that using separate precursors had the additional effect of improving the operational flexibility, allowing for adjustments in relative amounts to modify the perlite structure, as shown in example 4.

3.3.3 The board first notes that D6 already suggests (see page 6, 2nd paragraph) to coat perlite at an elevated temperature immediately after expansion. While D6 specifies a temperature range of 800–1000°C, as the proprietor also argued, this refers to the temperature of the perlite particles, not to the expander's injection point as defined in claim 1 and example 1 of the patent. Similarly, paragraph [0041] of the patent indicates that the stated range of 482–816°C also applies to perlite particles, meaning that at least when the patent discusses the temperature of the perlite particles, this overlaps with the range described in D6.

Since it is apparent in view of the above that D6 anticipates the general idea of coating the particles at elevated temperature and would thus achieve any associated effect, the only relevant question is whether the selected narrow range of 482°C to 593°C and/or the fact that this range concerns the injection point in the expander (rather than the perlite

particles) would achieve any additional or special effect.

The particle temperature range of 800 to 1000°C described in D6 arguably follows from the idea of immediately coating the particles after expansion, since perlite expansion typically occurs at 800–1100°C. In this respect, the reference in the patent (see para. [0041]) to a range of 482 to 816°C appears to cover both the possibility of immediately coating the particles after expansion or the possibility of doing so somewhere downstream. In any case, it remains unclear what specific particle temperatures would be covered by the narrower temperature range of 482–593°C at the injection point, as in view of the expected high temperature gradients within the expander and between the particles and their environment, a temperature within this range at the injection point could still be consistent with perlite particles being at temperatures above 800°C.

In view of the above, the board has concluded that the patent provides no clear basis for an invention based on precisely tuning the temperature at a specific point and/or within a narrow range to achieve any specific technical effect. Instead, both para. [0041] and example 1 are considered to discuss the same broader concept disclosed in D6, namely the idea of coating the perlite particles after expansion at an elevated temperature.

The only problem solved by the invention is therefore the provision of an alternative method.

3.4 Obviousness of the solution

3.4.1 The proprietor argued that neither D6, nor any of the other cited documents such as D9 or D10, taught that coating the particles at the proposed temperature range would provide an alternative to enhancing the compaction resistance without significantly increasing the compaction density. The invention could thus not be rendered obvious by D6 alone or in combination with these documents.

3.4.2 The board disagrees with this argumentation, because document D6 proposes two alternative methods for coating the particles. According to a first embodiment (see paragraph bridging pages 7 and 8 and claim 4), the particles are coated and dried in air. Although there is no explicit reference to "room temperature", the board interprets this method as involving the coating of particles at non-elevated temperatures. According to a second embodiment (see 2nd para. on page 8 and claim 7), the perlite particles are coated when they are still warm (a range of 800 to 1000°C is provided as an example of the concept "still warm" or "in noch warmen Zustand").

Since the specific temperature range of 482°C to 593°C proposed in claim 1 has not been associated with any specific technical effect, it is regarded as an arbitrary selection, so the only problem solved by the alleged invention is to propose an alternative method to that known from D6.

It follows that a skilled person starting from D6 and looking for an alternative process would, in view of the above teachings, contemplate coating the particles using different temperatures ranging from room temperature to expansion temperatures, and in doing so

would arrive at temperatures falling within the claimed range by simply conducting routine experimentation.

For the sake of completeness, the board notes that the additional differentiating features identified by the proprietor are also not considered to provide an inventive contribution. In particular, the board does not see how the provision of separate precursors could be linked to any unexpected or non-obvious effect, as it is standard practice in the field to form aluminum silicate by mixing soluble aluminum and silicate salts as proposed in the patent. In other words, it would be obvious in view of common general knowledge for a skilled person seeking to coat the perlite with an aluminum silicate as proposed in D6 to do so by combining separate precursors in the form of soluble aluminum and silicate salts.

In view of the above, the board concludes that the subject-matter of claim 1 is obvious when starting from D6 as the closest prior art.

3.5 The requirements of Article 56 EPC are thus not satisfied.

4. Since none of the requests submitted by the proprietor meet the requirements of the EPC and the patent shall be revoked, there is no need to address the additional request of the opponent to disregard the arguments and documents submitted by the patent proprietor on 28 February 2025.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The patent is revoked.

The Registrar: The Chairman:

A. Wille J.-M. Schwaller

Decision electronically authenticated