AUSTRALIA

Patents Act 1990

IN THE MATTER of
Australian Patent Application 2023201945
In the name of Kumiai Chemical Industry Co., Ltd.
- and -
Opposition thereto by Dan Yang

STATEMENT OF GROUNDS AND PARTICULARS

I, Dan Yang of Qinfengyuan Community, Zhangjiagang City, Jiangsu Province, China ("**the Opponent**"), provide the following information in support of the Notice of Opposition in relation to accepted Australian Patent Application 2023201945 ("**the opposed Application**") entitled "Process for producing herbicide and intermediate thereof" in the name of Kumiai Chemical Industry Co. ("**the Applicant**") which was filed on 30 March 2023 (**"the filing date**") as a divisional patent application of Australian Patent Application 2020300922 (**"the parent patent application ")** which parent patent application was filed on 30 August 2020 (**"the parent filing date")** being the Australian national phase entry application corresponding to International Patent Application No. PCT/JP2020/040748 (published as WO 2021/002484) and which claims priority from Japanese Provisional Application No. 2019-198600 filed on 31 October 2019 ("**the earliest priority date**").

The request for examination in relation to the opposed Application was filed on 23 June 2023. Consequently, substantive amendments to the *Patents Act 1990* (Cth) ("**the Act**") brought about by *the Intellectual Property Laws Amendment (Raising the Bar) Act 2012* (Cth) apply to the opposed Application.

The opposed claims

The opposed Application contains 20 accepted claims which read as follows:

1. An agrochemical composition comprising a crystal of pyroxasulfone and a surfactant, wherein the crystal of pyroxasulfone exhibits a spectrum having peaks at diffraction angles 2θ at least in the range of 17.7 to 17.8°, 18.0 to 18.1° and 19.9 to 20.0° in powder X-ray diffraction measurement by a transmission method using Cu-Kα ray, and the peak height of 19.9 to 20.0° is maximum among the three peaks.

2. The agrochemical composition according to claim 1, wherein the ratio of the peak height at 19.9 to 20.0° to the peak height at 17.7 to 17.8° is 1:0.02 to 1:0.95 in the powder X-ray diffraction measurement.

3. The agrochemical composition according to claim 2, wherein the ratio of the peak height at 19.9 to 20.0° to the peak height at 18.0 to 18.1° is 1:0.02 to 1:0.95 in the powder X-ray diffraction measurement.

4. The agrochemical composition according to any one of claims 1 to 3, wherein the crystal has a short columnar or columnar appearance.

5. A process for producing an agrochemical composition having a dosage form of a wettable powder, comprising:

a step of pulverizing a powder comprising a crystal of pyroxasulfone, and

a step of mixing the whole raw material comprising the pulverized crystal of pyroxasulfone, a surfactant and a solid carrier to homogenize the mixture,

wherein the crystal of pyroxasulfone exhibits a spectrum having peaks at diffraction angles 2θ at least in the range of 17.7 to 17.8°, 18.0 to 18.1° and 19.9 to 20.0° in powder X-ray diffraction measurement by a transmission method using Cu-Kα ray, and the peak height of 19.9 to 20.0° is maximum among the three peaks.

6. The process according to claim 5, wherein the ratio of the peak height at 19.9 to 20.0° to the peak height at 17.7 to 17.8° is 1:0.02 to 1:0.95 in the powder X-ray diffraction measurement.

7. The process according to claim 6, wherein the ratio of the peak height at 19.9 to 20.0° to the peak height at 18.0 to 18.1° is 1:0.02 to 1:0.95 in the powder X-ray diffraction measurement.

8. The process according to any one of claims 5 to 7, wherein the crystal has a short columnar or columnar appearance.

9. A process for producing an agrochemical composition having a dosage form of a water-dispersible granule, comprising:

a step of pulverizing a powder or a slurry comprising a crystal of pyroxasulfone,

a step of, while homogenizing the whole raw material comprising the pulverized crystal of pyroxasulfone, a surfactant and a solid carrier, further adding a slight amount of water and kneading the mixture,

a step of granulating the kneaded product obtained in the preceding step, and

a step of drying the granulated product obtained in the preceding step,

wherein the crystal of pyroxasulfone exhibits a spectrum having peaks at diffraction angles 2θ at least in the range of 17.7 to 17.8°, 18.0 to 18.1° and 19.9 to 20.0° in powder X-ray diffraction measurement by a transmission method using Cu-Kα ray, and the peak height of 19.9 to 20.0° is maximum among the three peaks.

10. The process according to claim 9, wherein the ratio of the peak height at 19.9 to 20.0° to the peak height at 17.7 to 17.8° is 1:0.02 to 1:0.95 in the powder X-ray diffraction measurement.

11. The process according to claim 10, wherein the ratio of the peak height at 19.9 to 20.0° to the peak height at 18.0 to 18.1° is 1:0.02 to 1:0.95 in the powder X-ray diffraction measurement.

12. The process according to any one of claims 9 to 11, wherein the crystal has a short columnar or columnar appearance.

13. A process for producing an agrochemical composition having a dosage form of an aqueous suspension concentrate, comprising:

a step of pulverizing a powder or slurry comprising a crystal of pyroxasulfone, and

a step of mixing the whole raw material comprising the pulverized crystal of pyroxasulfone, a surfactant and water to homogenize the mixture,

wherein the crystal of pyroxasulfone exhibits a spectrum having peaks at diffraction angles 2θ at least in the range of 17.7 to 17.8°, 18.0 to 18.1° and 19.9 to 20.0° in powder X-ray diffraction measurement by a transmission method using Cu-Kα ray, and the peak height of 19.9 to 20.0° is maximum among the three peaks.

14. The process according to claim 13, wherein the ratio of the peak height at 19.9 to 20.0° to the peak height at 17.7 to 17.8° is 1:0.02 to 1:0.95 in the powder X-ray diffraction measurement.

15. The process according to claim 14, wherein the ratio of the peak height at 19.9 to 20.0° to the peak height at 18.0 to 18.1° is 1:0.02 to 1:0.95 in the powder X-ray diffraction measurement.

16. The process according to any one of claims 13 to 15, wherein the crystal has a short columnar or columnar appearance.

17. A process for producing an agrochemical composition having a dosage form of an oil dispersion, comprising:

a step of pulverizing a powder or slurry comprising a crystal of pyroxasulfone, and

a step of mixing the whole raw material comprising the pulverized crystal of pyroxasulfone, a surfactant and an oil-based dispersion medium to homogenize the mixture,

wherein the crystal of pyroxasulfone exhibits a spectrum having peaks at diffraction angles 2θ at least in the range of 17.7 to 17.8°, 18.0 to 18.1° and 19.9 to 20.0° in powder X-ray diffraction measurement by a transmission method using Cu-Kα ray, and the peak height of 19.9 to 20.0° is maximum among the three peaks.

18. The process according to claim 17, wherein the ratio of the peak height at 19.9 to 20.0° to the peak height at 17.7 to 17.8° is 1:0.02 to 1:0.95 in the powder X-ray diffraction measurement.

19. The process according to claim 18, wherein the ratio of the peak height at 19.9 to 20.0° to the peak height at 18.0 to 18.1° is 1:0.02 to 1:0.95 in the powder X-ray diffraction measurement.

20. The process according to any one of claims 17 to 19, wherein the crystal has a short columnar or columnar appearance.

The problem

The problem the alleged invention sets out to solve is to provide a solid formulation comprising pyroxasulfone which does not form a lump when diluted in water and also aims to provide a pyroxasulfone-containing liquid formulation, a sprinkling liquid of which does not form a hard cake (see paragraph [0022] of the opposed Application). Reference is also made to paragraphs [0028], [0029] and [0030] of the opposed Application.

The solution

The solution resides providing an agrochemical composition comprising an alleged “novel” pyroxasulfone. The alleged “novel” pyroxasulfone may be prepared by:

(a) Distilling off an organic solvent from a solution of pyroxasulfone in a medium comprising the organic solvent as a main component to precipitate pyroxasulfone (see paragraphs [0844] and [0845] of the opposed Application). The choice of organic solvent is important in order to obtain the desired X-ray diffraction spectrum (see paragraph [0847] of the opposed Application). Suitable organic solvents for distillation are set out in paragraph [0848] of the opposed Application including, for example, dichloromethane, ethyl acetate and ethers (see also paragraphs [0031g], [0496] to [0500], [0514] to [0518] and [0524] to [0533] of the opposed Application); or

(b) Adding an antisolvent for pyroxasulfone to a solution of pyroxasulfone to precipitate pyroxasulfone (see paragraphs [0844] and [0846] of the opposed Application). The choice of organic solvent is important in order to obtain the desired X-ray diffraction

spectrum (see paragraph [847] of the opposed Application). Suitable antisolvents are set out in paragraphs [0853] and [0856] of the opposed Application including water (see also paragraphs [0031h], [501] to [0505] and [0519] to [0523] of the opposed Application.

The solution of pyroxasulfone may be a reaction solution used in a reaction for synthesizing pyroxasulfone, the process for synthesizing pyroxasulfone not being particularly limited and can be synthesized by a known processes (see paragraph [0860] of the opposed Application).

THE GROUNDS

The Grounds of Opposition relied on by the Opponent are as follows:

Ground 1: Section 59(a) of the Act – Not entitled to grant of a patent

The nominated person is not entitled to grant of a patent for the alleged invention as claimed in any one of claims 1 to 20 of the opposed Application as required by subsection 59(a) of the Act.

Ground 2: Section 59(b) of the Act

The alleged invention as claimed in any one claims 1 to 20 of the opposed Application is not a patentable invention because it does not comply with the following sections of the Act:

(i) section 18(1)- Not an Invention,

(ii) section 18(1)(a) – Not a Manner of Manufacture,

(iii) section 18(1)(b)(i) – Lack of Novelty,

(iv) section 18(1)(b)(ii) – Lack of Inventive step; and/or

(v) section 18(1)(c) – Lack of Utility.

Ground 3: Section 59(c) of the Act

The specification filed in respect of the opposed Application does not comply with subsections 40(2) or (3) of the Act.

DOCUMENTATION

The Opponent relies on at least the information in the documentation set out below as forming part of the prior art base for the opposed Application and/or common general knowledge at the earliest priority date:

D1 WO 2021/144796 (together with its priority document US 62/961,233 – **Designated D1A**)

D2 WO 2021/085395 (together with its priority document JP 2019-195254 – **Designated D2A**)

D3 US 2004/0110749 (English language counterpart to WO 2002/062770 - **Designated D3A**)

D4 US 20050215797

D5 US 20120264947

D6 Pyroxasulfone | New Active Ingredient Review – March 2013

D7 Pyroxasulfone Label – November 2016

D8 Public Release Summary on the Evaluation of the New Active PYROXASULFONE in the Product SAKURA® 850 WG HERBICIDE – October 2011

D9 2017 Weed Control Guide for Field Crops

D10 Herbicide Handbook - Weed Science Society of America - Tenth Edition, 2014

D11 Nakatani, Masao et al., “Development of the novel pre-emergence herbicide pyroxasulfone”, Journal of Pesticide Science, 41 (3), 107-112, 2016

D12 Jeyakumar, Kendasamy et al., “Simple and efficient method for the oxidation of sulfides to sulfones using hydrogen peroxide and a Mo(VI) based catalyst”, Catalyst Communications 10 (2009) 1948-1952.

D13 Recrystallization Guide: Process, Procedure, Solvents dated August 2019

D14 Mitsutaka Kitamura, “Controlling factor of polymorphism in crystallization process”, Journal of Crystal Growth, 2002, vol 237-239, 2205-2214.

D15 US 20110233812

D16 WO 2005/104848

D17 US 20050256004

D18 US 20170006870

D19 WO 2020/168997

D20 US 2021386060 (English language counterpart to WO 2020/090530- **Designated D20A**)

D21 US 2021392881(English language counterpart to WO 2020/090531- **Designated D21A**)

D22 US 2012220461

D23 US 2015/0005155

The Opponent reserves the right to include further prior art documents which come to light to support one or more of the grounds of opposition.

Additional Documentation relied upon:

D24 JP 2019-198600 being the document relied upon by the opposed Application to establish an alleged priority date of 31 October 2019.

D25 A Review on Polymorphism Perpetuates Pharmaceuticals N. L. Prasanthi et. al., America Journal of Advanced Drug Delivery [4][05][2016] 058-063.

A. Section 43 of the Act - Lack of Entitlement to Priority

A.1 One or more of the accepted claims of the opposed Application are not entitled to a priority date earlier than the parent filing date of 30 October 2020.

A.2 The Opponent will lead evidence to demonstrate that Applicant is not entitled to claim priority from Japanese Provisional Application No. 2019-198600 (**D24**) filed 31 October 2019.

The alleged earliest priority document JP 2019-198600 as filed on 31 October 2019 does not disclose the claimed invention in a manner that is clear enough and complete enough for the invention to be performed by a person skilled in the art.

There is no disclosure in JP 2019-198600 of a crystal of pyroxasulfone where the crystal exhibits a spectrum having peaks at diffraction angles of 2θ at least in the range of 17.8 to 17.9°, 18.0 to 18.1° and 19.9 to 20.0° in powder X-ray diffraction measured by a transmission method using Cu-Kα ray, and the peak height of 19.9 to 20.0° being maximum among the three peaks. No crystallographic date is provided in JP 2019-198600. There is also no disclosure of pyroxasulfone crystals having a short columnar or columnar appearance. No microscopic photographs are provided.

It is also apparent that the priority document provides no information concerning crystallization of pyroxasulfone in a manner so as to provide a crystal of pyroxasulfone having the defined peaks or the alleged benefit of the same. There is no disclosure in JP 2019-198600 of, for example, Examples 3, 3-1 to 3-12, Table 3-1, Example 3-A or 3-B, Comparative Examples 3-1 to 3-12, Table 4-1, Comparative Example 3-X, Comparative Example 3-Y, Test Example 3-1: Wettability, Table 5, Test Example 3-2: Redispersibility of diluted liquid and Table 6 of the opposed Application.

The Applicant was not in possession of the invention defined in any one of claims 1 to 20 when the priority document was filed. It follows that the earliest priority for the claims is the filing date of the parent patent application being 30 October 2020.

The content of the opposed Application is also deficient for the reason given below under section titled “Lack of Disclosure” - section 3.1.

A.3 The Opponent reserves the right to rely upon further particulars in support of its contest of the priority date.

FACTS & CIRCUMSTANCES SUPPORTING THE GROUNDS

1. Ground 1: Section 59(a) of the Act

1.1.1 The Applicant is not entitled to the grant of a patent for the alleged invention as claimed in any one of claim 1 to 20.

1.1.2 As the alleged invention as claimed in any one of claims 1 to 20 is not novel or inventive over prior art, the Applicant is not entitled to the invention.

1.1.3 The Opponent reserves the right to rely on further particulars in support of this ground of opposition.

2. Ground 2: Section 59(b) of the Act

2.1 Not an Invention – Section 18(1)

2.1.1 The alleged invention, so far as claimed in any one of claims 1 to 20, is not a patentable invention in that it does not satisfy the threshold requirement of "invention" for the purposes of section 18(1) of the Act.

2.1.2 The Applicant, by its own admission, has stated in the specification of the opposed Application that each element of the alleged invention claimed in any one of claims 1 to 20 was known, either in fact or as a concept which it was likely to be desirable to investigate, to persons skilled in the art at the earliest priority date or an alternative later priority date as set out above in Part A, including but not limited to reference in the specification to:

(a) Pyroxasulfone being a known herbicide (see paragraph [0004] of the opposed Application) and the products obtained in the invention being **known** compounds and identified in the usual manner known to a person skilled in the art (see paragraph [0902] of the opposed Application) including by powder X-ray diffraction (see paragraph [0911] of the opposed Application) and observation under a microscope, the observation method not being particularly limited (see paragraph [0861] of the opposed Application).

(b) Pyroxasulfone can be synthesized according to known processes including by oxidizing a sulphide and the process of manufacture is not particularly limited (see paragraphs [005] to [0016] and [0860] of the opposed Application).

(c) Pyroxasulfone can be isolated and purified from the reaction mixture by conventional methods known to a person skilled in the art (e.g., extraction, washing, crystallization including recrystallization, crystal washing, and/or other procedures (see, for example, paragraphs [0802] and [0805] of the opposed Application)).

(d) Crystallization and recrystallization of a target product are conventional methods known to a person skilled in the art including using an antisolvent, cooling a saturated solution or removing a solvent (see paragraphs [0805] and [0806] of the opposed Application). More particularly using known crystallization techniques such as a concentration method, an

antisolvent addition method, a vapor diffusion method (including a sitting drop method, a hanging drop method and a sandwich drop method), a batch method (including an oil batch method), a dialysis method, a liquid-liquid diffusion method (a counter diffusion method), a cooling method, a pressure method, a melt quenching method, a temperature cycling method, a slurry stirring method, and an ultrasonic method. The concentration method being one in which an organic solvent is distilled off from a solution of pyroxasulfone comprising a solvent mainly composed of the organic solvent and pyroxasulfone as a solute to precipitate the pyroxasulfone. The antisolvent addition method being one in which an antisolvent for pyroxasulfone is added to a solution of pyroxasulfone comprising a solvent mainly composed of an organic solvent and pyroxasulfone as a solute to precipitate the pyroxasulfone (see paragraphs [0844] to [0846] of the opposed Application).

(e) Conventional agrochemical formulations containing pyroxasulfone are known (see paragraph [0028] of the opposed Application) including as solid formulation such as a wettable powder (see paragraph [0029]) or a liquid formulation such as an aqueous suspension concentrate (SC) or an oil dispersion (see paragraph [0030] of the opposed Application).

(f) The crystal of pyroxasulfone can be processed into agrochemical formulations in various dosage forms by known conventional formulation techniques (see paragraph [0865) of the opposed Application). Examples of known dosage forms include: an embodiment of a formulation in which the formulation is sprinkled as it is on a farmland or the like, such as a dust and a granule; an embodiment of a formulation in which the formulation is dispersed in sprinkling water to form a suspension and the suspension is sprinkled on a farmland or the like, such as a wettable powder, a water-dispersible granule, an aqueous suspension concentrate and an oil dispersion; an embodiment of a formulation in which the formulation is dispersed in sprinkling water to prepare an emulsion and the emulsion is sprinkled on a farmland or the like, such as an emulsifiable concentrate and an emulsion in water (see paragraph [0866] of the opposed Application). Processes for preparing the agrochemical formulation are conventional, are not particularly limited and include the presence of a surfactant as an agrochemical auxiliary (see paragraphs [0872], [0873], [0874], [0875], [0888], [0890] and [0892] of the opposed Application).

2.1.3 Claims 1 to 20 are not an invention as they merely claim known agrochemical compositions comprising a known compound of pyroxasulfone together with a surfactant (a known agrochemical auxiliary) and known processes for making agrochemical compositions.

2.1.4 The Opponent reserves the right to rely on further particulars in support of this ground of opposition.

2.2 Not a Manner of Manufacture - Section 18(1)(a)

2.2.1. The alleged invention, so far as claimed in any one of claims 1 to 20, is not a patentable invention because it is not a manner of manufacture within the meaning of Section 6 of the Stature of Monopolies as required by section 18(1)(a) of the Act.

2.2.2 The alleged invention is directed to a list of known features with no novelty conferring arrangement or inter-relationship. The features of the alleged invention are one or more of: a mere collocation of known integers performing their known function and the use of known process for an old purpose. The claims do not constitute a manner of manufacture.

2.2.3 Reference is made to paragraphs 2.1.2 and 2.1.3 above. The opposed Application acknowledges that pyroxasulfone is a well-known herbicide used in agrochemical compositions such as wettable powders, aqueous suspension concentrates and oil dispersions, the dosage forms prepared by known methods. The claims attempt to gain patent protection for known agrochemical compositions and methods for their preparation.

2.2.4 The alleged problem as set out in paragraphs [0028] to [0031] of the opposed Application that the invention sets out to solve, at least in a preferred embodiment, is that conventional agrochemical formulations containing pyroxasulfone have **sometimes** shown physicochemical defects such as slow blending and formation of lumps in diluted wettable powders and difficulty in redispersal in aqueous suspension concentrates and oil dispersions. However, as the alleged novel crystal of pyroxasulfone exhibiting the X-ray diffraction spectrum peaks as claimed was already known before the earliest priority date or an alternative later priority date as set out above in Part A and formulated into agrochemical formulations together with surfactants such as wettable powders, aqueous suspension concentrates or oil dispersions, this problem has already been addressed by the prior art.

2.2.5 The alleged invention so far as claimed in any one of claims 1 to 20 merely recites known agrochemical compositions and methods of making them being a collocation or mere admixture of a known crystal of pyroxasulfone and a surfactant, the components separately and together were well known before the earliest priority date or an alternative later priority date being set out above in Part A. The Opponent will lead evidence which shows that the agrochemical composition of any one of claims 1 to 4, as well as the processes of producing same as claimed in any one of claims 5 to 20 were widely known and used in the art either taken alone or together with the common general knowledge.

2.2.6 The alleged invention is not a manner of manufacture in light of what was known in the prior art base before the earliest priority date or an alternative later priority date as set out above in Part A as evidenced by the information referred to in paragraphs 2.2.2 to 2.2.5 above and section 2.3 and 2.4 below.

2.2.7 The Opponent reserves the right to rely on further particulars in support of this ground of opposition.

2.3 Lack of Novelty - Section 18(1)(b)(i)

2.3.1 The alleged invention, so far as claimed in any one of claims 1 to 20, is not a patentable invention because it does not comply with section 18(1)(b)(i) in that it is not novel when compared with the prior art base as it existed before the earliest priority date or an alternative later priority date as set out above in Part A.

2.3.2 The prior art base relied upon includes *inter alia* the common general knowledge of a person or persons skilled in the relevant art as it existed before the earliest priority date of any one of the claims or an alternative later priority date as set out above in Part A and the prior art documents listed below.

Whole of Contents Novelty

2.3.3 **D1** [WO 2021/144796 (PCT/IL2021/050042)] which designated Australia claims priority to US 62/961,233 filed on 15 January 2020 (**D1A**) which is before the parent filing date of 30 October 2020. The subject matter in WO 2021/144796 is entitled to the earliest priority date as the subject matter is identical in all relevant aspects.

As stated above, the present claims are not entitled to claim the earliest priority date of 31 October 2019 and take the filing date of 30 October 2020 for priority.

D1 describes a solid-state form of pyroxasulfone, processes for its preparation and agrochemical compositions containing the pyroxasulfone. D1 at page 6, paragraphs 1 and 2 and Figure 1 shows X-ray CuKα diffraction data for pyroxasulfone having peaks at 17.8 to 17.9°, 18.0 to 18.1° and 19.9 to 20.0° with the peak height of 19.9 to 20.0° being maximum among the three peaks and having the peak ratios claimed in the opposed Application claims. Since the crystal is identical to that claimed in the opposed Application, it is an inevitable consequence that the appearance of the crystals will be short columnar or columnar in appearance. Adding an inevitable undisclosed parameter such as crystal appearance does not confer novelty on a claim.

The solid-state form of pyroxasulfone in D1 is isolated (physically separated) from the reaction mixture in which it is formed by subjecting a solution of pyroxasulfone in a solvent system, followed by decantation and drying, wherein the solvent system is selected from a series of solvents comprising methanol, ethyl acetate, tetrahydrofuran (THF), 2-methyl THF, dichloromethane, n-heptane, propyl acetate, toluene and combinations thereof (see claims 9 and 10).

The solid-state forms of pyroxasulfone in D1 can be used as a herbicide in agrochemical compositions for the selective control of grasses and broadleaf weeds in crops (see claim 8).

In particular, claim 5 claims an agrochemical formulation comprising the crystalline form of pyroxasulfone together with at least one agrochemically acceptable excipient and claim 4 claims the use of the crystalline form of pyroxasulfone in the preparation of an agrochemical composition and/or formulation.

Information that is sufficiently disclosed and would serve as basis for valid notional claims having an earlier priority date than that of the opposed Application are the following:

> An agrochemical composition comprising a crystalline form of pyroxasulfone as depicted in Figure 1 (see claim 3),
>
> An agrochemical formulation comprising a crystalline form of pyroxasulfone as depicted in Figure 1 and at least one agrochemically acceptable excipient (see claim 5); and
>
> Use of a crystalline form of pyroxasulfone as depicted in Figure 1 in the preparation of an agrochemical composition and/or formulation.

The basic test for anticipation or want of novelty is the same as that for infringement and generally one can properly ask oneself whether the alleged anticipation would, if the patent were valid, constitute an infringement.

The notional claims as set out above are broader than claims 1 to 20 of the opposed Application and would, if the opposed Application was valid, constitute an infringement. A surfactant falls within the scope of the phrase “at least one agrochemically acceptable excipient”. Use in the preparation of an agrochemical composition and/or formulation would include processes for making wettable powders, water-dispersible granules, aqueous suspension concentrates and oil dispersions and would, as a matter of course, include pulverization of crystals/crystal slurries, mixing (in the presence of one or more of surfactants, solid carriers, water and oil-based dispersion mediums), kneading, granulating and drying as required.

Having regard to the above, the Opponent will contend that claims 1 to 20 lack novelty in light of the disclosure in D1.

2.3.4 Further, and in the alternative, claims 1 to 20 of the opposed Application lack novelty in light of WO 2021/085395 (**D2**). This citation has an earliest priority date of 28 October 2019 and was filed on 27 October 2020 and published on 6 May 2021. D2 describes an agrochemical composition comprising a water-soluble polymer and an agrochemical active ingredient crystal particles (such as pyroxasulfone) having a specific volume median diameter. Granular, suspension, powder and solution compositions and methods for their preparation are described. A number of the water-soluble polymers described are also surfactants (e.g., polyethylene oxide and polyvinylpyrrolidone). The composition may include solid carriers

and excipients including surfactants. Diffraction patterns using XRD are described to confirm the presence of crystal particles. Example 13 describes a wet-pulverized composition of pyroxasulfone including a surfactant. The Opponent will lead evidence which demonstrates that claims 1 to 20 lack novelty in light of the disclosure in D2.

Prior Publications

2.3.5 The alleged invention as claimed in any one of claims is disclosed in US 2004110749 (**D3**). D3 describes isooxazoline derivatives and herbicides containing them. Pyroxasulfone is described in Table 3 on page 13 and is compound 3-0054 having a melting point of 129-130°C (see Table 13) indicating that it was prepared and isolated. Paragraphs [0092], [0197], [0204], [0210], [0217], [0223], [0229], [0236], [0243], [0252], [0258] and [0265] include production processes for preparing the compounds.

The examples generally describe preparation of compounds similar to pyroxasulfone and listed in Table 3. The examples of D3 describe three options for isolating those compounds from the reaction mixture:

(a) After completion of the reaction and formation of the compound listed in Table 3, the reaction mixture is poured into water followed by extraction with ethyl acetate, washing the resulting organic layer with aqueous sodium chloride solution, drying over anhydrous magnesium sulfate and subjecting the resulting solution to vacuum distillation to remove the solvent to produce a residue/crystals (see Examples 1, 4, 5, 7, 9, 10, 11, 14, 16, 18, 19, 21, 23, 25, 27, 29 and 41). While some examples purify the residue by silica gel chromatography, this is not used in Example 5, 10, 16, 18, 19 and 25. Example 10 specifically refers to the presence of “light yellow crystals”.

(b) After completion of the reaction and formation of the compound listed in Table 3, the reaction mixture is subjected to vacuum distillation to remove the solvent (hydrogen bromide acetic acid), poured into water and the resulting crystals collected by filtration (Example 15).

(c) After completion of the reaction and formation of the compound listed in Table 3, the reaction mixture is poured into water followed by extraction with chloroform, washing the resulting organic layer with aqueous sodium hydrogen sulfite, an aqueous sodium hydrogencarbonate solution and an aqueous sodium chloride solution, drying over anhydrous magnesium sulfate and subjecting the resulting solution to vacuum distillation to remove the solvent to produce residue/crystals (See Examples 2, 3, 6, 8, 12, 13, 17, 20, 22, 24, 26, 28 and 42).

D3 clearly provides direction to use one of the above three methods to isolate the compound of Table 3 including pyroxasulfone. D3 does not teach any of the three methods are to be preferred.

Example 3-5 of the opposed Application dissolves pyroxasulfone in ethyl acetate and evaporates the ethyl acetate under normal pressure to precipitate crystals of pyroxasulfone. The opposed Application describes the use of washing with aqueous alkaline solutions (see paragraphs [0623], [0802] and [0805] of the opposed Application) and drying of crystals (see the Examples of the opposed Application) and that normal, reduced or increased pressure may be used (paragraph [0845]). The only requirement set out in the opposed Application is in paragraph [0847] which indicates that the choice of solvent for obtaining the crystal of pyroxasulfone is extremely important. Ethyl acetate is described as being a suitable solvent for distilling off to precipitate the pyroxasulfone (see paragraph [0848] of the opposed Application).

It follows that a person skilled in the art is directed by the teaching in D3 to isolate pyroxasulfone using one of the above three options including using option (a) by evaporating/distilling a solution containing pyroxasulfone in ethyl acetate and it is inevitable that by following this teaching in D3 that the pyroxasulfone will have the diffraction peaks described in Example 3-5 and Table 3 of the opposed Application (which used ethyl acetate) and will also have the ratios of peak heights and crystal appearance of the pyroxasulfone crystal as claimed in any one of claims 1 to 20.

The herbicides described in D3 can be used to treat weeds (paragraph [0007]). Paragraphs [0465] to [481] describes herbicides containing the compounds of the invention in the form a powder, a wettable, powder, an emulsifiable concentrate, a flowable, fine granules, granules prepared by mixing with a carrier, a surfactant, a dispersant, an adjuvant etc. all generally used in formulation (see paragraph [0466]). D3 describes formulation 1 (wettable powder), formulation 2 (flowable granules), formulation 3 (emulsion) and formulation 4 (granules) using preparation methods including kneading and pulverization. In particular, the wettable powder is formed by mixing and pulverization. The granule is formed by kneading, granulation (extrusion) and drying. The flowable is formed by mixing coarse ground compound with water. The emulsion is formed by mixing surfactant/dispersant.

Application Examples 1 to 3 describe wettable powders (Formulation 1) diluted with water and sprayed on the whole foliage of plants from above using a small sprayer. Compound 3-0054 was applied as wettable powder comprising polyoxyethylene octylphenyl ether (a surfactant), sodium salt of a β-napthalenesulfonic acid-formalin condensate (a dispersant), diatomaceous earth (solid carrier) and clay (solid carrier).

2.3.6 Having regard to the above the Opponent will lead evidence in support of its contention that claims 1 to 20 lack novelty in light of the disclosure in D3.

2.3.7 The Opponent reserves the right to rely on further particulars in support of this ground of opposition.

2.4 Lack of Inventive Step - Section 18(1)(b)(ii)

2.4.1 The alleged invention, so far as claimed in any one of claims 1 to 20, is not a patentable invention because it does not comply with section 18(1)(b)(ii) in that it does not involve an inventive step when compared with the prior art as it existed before the earliest priority date or an alternative later priority date as set out above in Part A.

The person skilled in the art

2.4.2 The skilled person is the addressee of the opposed Application which relates to agrochemical compositions comprising a particular crystal of pyroxasulfone and a surfactant and processes for making them. The skilled person, who may form part of a team, is cognizant in herbicidal formulations, methods of making them and the use of X-ray diffraction techniques and microscopic analysis and would include most notably any person involved in chemical synthesis.

The common general knowledge

2.4.3 The alleged invention, so far as claimed in any one of claims 1 to 20, is not a patentable invention in light of the common general knowledge in Australia known amongst persons skilled in the art before the earliest priority date or an alternative later priority date as set out above in Part A, whether the common general knowledge is taken alone or together with the disclosure in any one of the documents D3 to D23 and/or D25 as well as information acknowledged in the specification of the opposed Application and referred to in section 2.1.2 and 2.1.3 above.

2.4.4 The Opponent will adduce evidence that the common general knowledge of a person or persons skilled in the art before the earliest priority date or an alternative later priority date as set out above in Part A included the information already confirmed as common general knowledge in the specification as set out in paragraphs 2.1.2 and 2.1.3 above and the common general knowledge of a person skilled in the art at the relevant priority date which included at least one or more of the following:

(a) Pyroxasulfone is a known herbicide for treating weeds.

(b) As a herbicide, pyroxasulfone can be formulated into an agrochemical composition. Agrochemical compositions containing pyroxasulfone may also include excipients such as surfactants, solid carriers and liquid carriers.

(c) Pyroxasulfone agrochemical compositions may be of the form of a wettable powder, a water-dispersible granule, an aqueous suspension concentrate or an oil dispersion.

(d) Wettable powders may be prepared by pulverization of a herbicide and homogenously mixing with a surfactant and a solid carrier.

(e) Water-dispersible granules may be prepared by pulverization of a herbicide, homogenously mixing with a surfactant and a solid carrier, kneading in the presence of water followed by granulating and drying.

(f) Aqueous suspension concentrates can be prepared by pulverization of a herbicide and homogenously mixing with a surfactant and water.

(g) Oil dispersions can be prepared by pulverization of a herbicide and homogenously mixing with a surfactant and an oil-based dispersion medium.

(h) It is well known that a sulfone such as pyroxasulfone can be separated from a reaction mixture using well known crystallization techniques. For example, pyroxasulfone can be prepared by distilling off an organic solvent from a solution of pyroxasulfone in a medium composed of a liquid comprising the organic solvent as a main component to precipitate pyroxasulfone. Suitable solvents include ethyl acetate and diethyl ether. Alternatively, pyroxasulfone can be prepared by addition an antisolvent to a solution of pyroxasulfone comprising a solvent mainly composed of an organic solvent and pyroxasulfone as a solute to precipitate the pyroxasulfone. Suitable antisolvents include water.

(i) Pyroxasulfone exists in a crystalline form.

(j) Crystalline chemical compounds can have different crystalline form (polymorphs) where there are different arrangements and/or conformations in the crystal lattice. One polymorph can display beneficial effects (such as suitability for preparation of useful formulations and/or improved biological performance) compared to another polymorph. Stability of polymorphs is a function of temperature and pressure (**D25**).

(k) Polymorphs can be prepared by crystallization using selected solvents and temperatures and be confirmed by XRD and visual observation.

2.4.5 The subject matter of claims 1 to 20 of the opposed Application lack an inventive step in view of the common general knowledge as it existed in Australia at the earliest priority date or an alternative later priority date as set out above in Part A, taken alone or together with any of the publications D3 to D23 and/or D25, taken alone or in combination, each publication being a document that the person skilled in the art would have referred to in the context of providing an agrochemical composition comprising pyroxasulfone.

2.4.6 US 2004110749 (**D3**) referred to above is the original patent application covering pyroxasulfone and is described in the background art section in the opposed Application as being well known (see paragraph [004] of the opposed Application which refers to the corresponding WO 2002/062770 Patent Document 2). D3 describes pyroxasulfone for treating weeds. The pyroxasulfone is isolated as a melting point for the compound is provided (compound 3-0054 (Table 13).

As a herbicide, D3 describes pyroxasulfone formulated into agrochemical compositions and including excipients such as surfactants, solid carriers and liquid carriers. D3 describes agrochemical compositions in the form of wettable powders, water-dispersible granules, aqueous suspension concentrates and oil dispersions wherein:

(a) the wettable powders are prepared by pulverization of a herbicide and homogenously mixing with a surfactant and a solid carrier;

(b) the water-dispersible granules are prepared by pulverization of a herbicide, homogenously mixing with a surfactant and a solid carrier, kneading in the presence of water followed by granulating and drying;

(c) the aqueous suspension concentrates are prepared by pulverization of a herbicide and homogenously mixing with a surfactant and water; and

(d) the oil dispersions are prepared by pulverization of a herbicide and homogenously mixing with a surfactant and an oil-based dispersion medium.

The Application Examples uses compound 3-0054 in Formulation 1 (a wettable powder) including a solid carrier and a surfactant.

D3 also describes similar compounds to pyroxasulfone being separated from a reaction mixture by distilling off an organic solvent (ethyl acetate) from a solution of pyroxasulfone in a medium composed of a liquid comprising the organic solvent as a main component to precipitate pyroxasulfone (ethyl acetate). It is inevitable that by following the teaching of D3 and selecting distillation using ethyl acetate that the resulting crystals will display the diffraction peaks, ratios and crystal appearance claimed in the opposed Application.

As D3 describes the subject matter of each of claims 1 to 20 as set out above under Novelty and are not novel, likewise claims 1 to 20 are not inventive in view of the common general knowledge.

A person skilled in the art looking to provide an agrochemical composition comprising pyroxasulfone would have routinely arrived at the composition of any one of claims 1 to 4 or the process of any one of claims 5 to 20 in view of their common general knowledge and the teaching in D3.

2.4.7 A person skilled in the art looking to provide an agrochemical composition comprising pyroxasulfone would have routinely arrived at the composition of any one of claims 1 to 4 of the process of any one of claims 5 to 20 in view of their common general knowledge and the teaching in any one of D3 to D23 and/or D25 either taken alone or when combined. Claims 1 to 20 lack an inventive step.

2.4.8 US 20050215797 (**D4**) is known and is described in the background art in the opposed Application (corresponding to Patent Document 2 WO 2004/013106) and covers similar

subject matter to D3. The document cross references JP 308857/2002 (equivalent to D3) in the description of the prior art (see paragraph [002]. D4 describes in Reference Example 3 production of pyroxasulfone including extraction with chloroform and removal of the solvent by evaporation to form a white powder (see paragraph [0237]) i.e., the distillation method. This document clearly shows that the skilled person reading D4 would be led to as a matter of course to try one of the three options set out above and, in this instance, chose option 3 (distillation in chloroform). Paragraph [0293] describes formulations including dusts, wettable powder, an emulsifiable concentrate, a flowable, a microgranule, a granule or the like by mixing with a carrier, a surfactant, a dispersing agent, an auxiliary agent or the like. Reference formulation examples include a wettable powder (see paragraph [0300]), flowable (see paragraph [0301]), emulsifiable concentrates (see paragraph [0302] and granules (see paragraph [0303]), each including the presence of surfactants and carriers and including pulverization, kneading, and drying. D4 describes use of the formulation including pyroxasulfone for treating weeds (See Reference Test Examples 2 and 3 which use reference example no. 3).

2.4.9 US 20120264947 (**D5**) is known, is Patent Document 10 and corresponds to Patent Document 7 JP 2013-512201 described in the background art of the opposed specification. D5 cross references WO 2002062770 in paragraph [0006]. This document describes in Example 9c use of the antisolvent method in which pyroxasulfone is precipitated by adding water and cooling.

2.4.10 **D6** entitled “Pyroxasulfone” New Active Ingredient Review Updated March 2013 describes pyroxasulfone as being a selective herbicide for controlling annual grasses, sedges and annual broadleaf weeds and having the CAS number 447399-55-5.

2.4.11 **D7** being a November 2016 label for the herbicide Pyroxasulfone 85 WG, describes it as being a water dispersible granule for selective weed control.

2.4.12 **D8** dated October 2011 is an APVMA (Australian) public release summary for the evaluation of the new active pyroxasulfone in the product Sakura® 850 WB herbicide. Page 1 refers to the herbicide as a water dispersible granule formulation and intended for the pre-emergence control of annual ryegrass, certain other grass weeds and toad rush in wheat (not duram wheat), barley and triticale. Pyroxasulfone is described as having the CAS number 447399-55-5 and being a **crystalline** solid (see pages 2 and 3).

2.4.13 **D9** being a 2017 Weed Control Guid for Field Crops and describes the use of pyroxasulfone together with a surfactant (see page 39) for treating weeds.

2.4.14 **D10** being a herbicide handbook from 2014 and describes pyroxasulfone as being a white crystal solid and use for the control of grasses and small-seed broadleaves.

2.4.15 **D11** Nakatani, Masao et., Development of the novel pre-emergence herbicide pyroxasulfone", Journal of Pesticide Science, 2016 which describes the discovery of pyroxasulfone as a novel pre-emergence herbicide for wheat, corn and soybean having the CAS number 447399-55-5 and being a white **crystalline** solid.

2.4.16 **D12** Jeyakumar in a Simple and Efficient Method for the oxidation of sulfides to sulfones using hydrogen peroxide and a Mo(VI) based catalyst describes a general procedure for oxidation of sulfides to sulfones (see paragraph 2.2) as involving reaction of a sulfide, methanol, and ammonium heptamolybdate, evaporation of the methanol, washing with $NaHCO_3$ and extraction with diethyl ether followed by evaporation to isolate the compound. Ethers are described in the opposed Application is being a suitable solvent for distillation to precipitate pyroxasulfone.

2.4.17 **D13** Recrystallization Guide dated 30 November 2018 describes recrystallization methods including antisolvent recrystallization and evaporative recrystallization and the importance of solvent screening. There is discussion of formation of polymorphs. D13 states that recrystallization can minimize the crystal's internal energy in order to reach a more global energy equilibrium resulting in a stable polymorph. Recrystallization is usually applied deliberately to optimize crystals and processes. According to the Wayback machine this document was saved twice in 2019. This document teaches the desire to deploy strategies during crystallization to deliver a crystal product with desired properties.

2.4.18 **D14** Mitsutaka Kitamura, "Controlling Factor of Polymorphism in Crystallization Process", Journal Crystal Growth, 2002, vol 237-239 describes controlling factors and mechanisms in the crystallization of polymorphs and refers to differences in molecular conformation between polymorphs (see Abstract). The Abstract states that selective crystallization of polymorphs can be controlled based on supersaturation degree and the additive concentration. The Introduction states that the molecular arrangement in crystals frequently decide the functionality and properties (e.g., bioavailability, morphology, and purity) of many kinds of materials and crystallization is frequently influenced by solvents. Antisolvents are frequently used. Under the heading Result and Discussion, SEM (scanning electron microscope) photographs are used to analyse the polymorphs. It follows that it is common practice for persons skilled in the art to look for crystals or crystal polymorphs in consideration of their usefulness/functionality by selective crystallization.

2.4.19 US 20110233812 (**D15**) describes a process for producing a water-dispersible particulate agricultural chemical composition by kneading an agricultural-chemical active ingredient such as pyroxasulfone, a surfactant and water, extruding through a screen to form granules and drying including pulverizing the granules. The background art refers to dusts, granules, wettable powders, water-dispersible particulates, liquids, aqueous suspensions, emulsifiable concentrates as agricultural-chemical compositions as being well known and description of

granulation methods using powdered actives and surfactants (see paragraphs [0002] and [0003]). Example 6 describes forming a water-dispersible particulate composition by mixing ground pyroxasulfone, surfactant and a solid carrier including kneading and granulation.

2.4.20 WO 2005/104848 (**D16**) describes herbicidal compositions including pyroxasulfone (compound 1.27) and a safener for treating weeds (see abstract). Pages 34 and 40 to 43 refers to various formulations including formulation auxiliaries such as carriers, solvents and surface-active substances (surfactants) and in the form of, for example, dusting powders, wettable powders, water-dispersible granules, aqueous dispersions and oil dispersions including methods for their manufacture (including reference to pulverization).

2.4.21 US 20050256004 (**D17**) describes synergistic herbicidal compositions comprising pyroxasulfone together with another herbicide (see paragraph [0005]) for treating weeds (see paragraph [0085]). Compounds 3-0054 and 3-0188 in Tables 3 and 7 are pyroxasulfone. The herbicide can be used in the form of a wettable powder, granules, fine granules, a powder, an emulsifiable concentrate, a solution, a suspension, a flowable by mixing with a carrier, a surfactant, a dispersant, an adjuvant etc. (see paragraph [0118]). Preparation Example 46 describes the preparation of pyroxasulfone using extraction into chloroform followed by vacuum distillation. Paragraphs [0397] to [398] describes the preparation of a wettable powder including the compound, cyanazine, polyoxyethylene octyl ether (surfactant), sodium salt of an alkayl-naphthalenesulfone acid-formalin condensate (surfactant), diatomaceous earth (carrier) and clay (carrier) by mixing and pulverizing. Table 17 and Application Example 2 describes the application of compound 3-0188.

2.4.22 US 20170006870 (**D18**) describes an agrochemical composition for foliage treatment comprising pyroxasulfone and a masking material, the pyroxasulfone being microencapsulated in or coated with the masking material (such as a wax). Pyroxasulfone is described as having a high level of herbicidal effect on weeds (paragraph [002]) and the pyroxasulfone is crystalline (paragraph [0013]). The agrochemical composition can be in the form of a dust powder, granule, wettable powder, water-dispersible granule, aqueous suspension concentrate or oil-based suspension concentrate (paragraphs [0018] and [0061]). The microcapsulation may also include the presence of watersoluble thickeners, nonionic surfactants, anionic surfactants, and antifoaming agents (paragraph [0041]). The agrochemical compositions may include additional components such as solid carriers, liquid carriers, surfactants, binders, tackifiers, thickeners, colorants, spreaders, stickers, antifreezing agents, anticaking agents, disintegrators, stabilizers and antifoaming agents (paragraph [0044]). The agrochemical composiitons may be prepared by blending the agrochemical active ingredients with the pyroxasulfone (paragraph [0067], [0077] to [0079] including the use of kneading, granulation and drying and suspension in water. In particular of relevance Comparative Example 1 describes pulverization of pyroxasulfone, sodium

alkylphenyl ether (surfactant), sodium lignin sulfonate (anionic surfactant), diatomaceous earth (a carrier) and clay (a carrier), admixing with water for kneading followed by extrusion granulation and drying.

2.4.23 WO 2020/168997 (published 27 August 2020) (**D19**) describes similar isoxazoles to pyroxasulfone and specifically refers to isoxazoles described in WO 2002062770 (D3) on page 1. Methods of preparation of the compounds include extraction with dichloromethane followed by concentration *in vacuo* to remove the solvent (Examples 1 to 6). The opposed Application describes dichloromethane as being a suitable solvent. Page 24 refers to the use as a herbicide together with surfactants, solid diluents, liquid diluents, wetting agents, dispersants, emulsifiers, thickeners, disintegrating agents, antifreeze agents, defoaming agents, preservative and stabilizers and can be in the form of both liquid and solid compositions, solutions, emulsifiable concentrates, suspensions, emulsions (including microemulsions and/or suspoemulsions, gels, dusts, powders, granule, pellets for example. The formulations can be prepared by grinding in a liquid or dry diluent (page 28). The Examples compare their results with pyroxasulfone.

2.4.24 WO 2020/090530 (published 7 May 2020) (**D20A**) corresponding to US 2021386060 (**D20**) and WO 2020/090531 (published 7 May 2020) (**D21A**) corresponding to US 2021392881 (**D21**) describe microcapsule compositions containing pyroxasulfone, a process for making it, formulations containing the same and a weed control method. The Examples describe microcapsule compositions comprising pyroxasulfone and a surfactant.

2.4.25 US 2012220461 (**D22**) describes crystal forms of sulfonylurea useful as herbicides having improved storage stability (paragraph [0028]) and which can be combined with pyroxasulfone. Various polymorphs are prepared and analysed by XRD analysis (Figures) and produced either by dissolving the compound in a solvent followed by evaporation or adding a poor solvent (an antisolvent) to the solution to elevate the degree of supersaturation of the solution to precipitate a crystal (see for example paragraph [0012]). Similar solvents as used in the opposed Application are described. The herbicide can be used together with a surfactant. Similarly, US 2015/0005155 (**D23**) describes polymorphs of a herbicide safener analysed by XRD diffraction and having improved stability. The safener can be combined with pyroxasulfone. Agrochemical compositions including surface-active agents, solvents and carriers are described. In paragraph [0060] polymorphs are describes as being a form of a crystal where the constituent molecules are arranged in orderly repeating patterns extending in all three spatial dimensions. Different polymorphs of a compound have different arrangements of atoms or molecules in their crystal form. The difference in crystal structure can lead to different polymorphs having differing chemical, physical and biological properties. A specific polymorph may have properties which make it more advantageous in a particular use relative to another polymorph of the same compound having regard to differences in, for

example, crystal shape, chemical stability, and suspensibility. This document shows the desire to produce polymorphs by selective crystallization to find crystals with improved functionality.

2.4.26 The opposed Application states in paragraph [0869] that the solution of pyroxasulfone may a reaction solution used in a reaction for synthesizing pyroxasulfone and that the process for synthesizing pyroxasulfone is not particularly limited. As any method of preparing pyroxasulfone can be used claims 1 to 20 are not inventive because all the Applicant is doing is using conventional recrystallization techniques and using known solvents to achieve the claimed pyroxasulfone crystals (see paragraph [0844]) and formulating those pyroxasulfone crystals into various agrochemical compositions. The subject matter of claims 1 to 20 is nothing more than an aggregation of well-known features in the common general knowledge that the person skilled in the art would routinely arrive at without the exercise of any inventive skill. The technical effect was also known before the priority date.

2.4.27 The Opponent reserves the right to rely on further particulars in support of this ground of opposition.

2.5 Lack of Utility - Section 18(1)(c)

2.5.1 The alleged invention, so far as claimed in at least claims 1 to 20 lacks utility in that it is not useful.

2.5.1 By following the information provided in the specification it is not possible to achieve the promise of the invention. The specification states in paragraph [0869] that the solution of pyroxasulfone may be a reaction solution used in a reaction for synthesizing pyroxasulfone and that the process for synthesizing pyroxasulfone is not particularly limited. In paragraph [0847], the specification states that any organic solvent cannot necessarily be used in the process for obtaining a crystal of pyroxasulfone of the invention and that selection of an organic solvent is extremely important. When the selection of organic solvent is wrong, crystals of pyroxasulfone having the characteristic pattern observed in the desired powder X-ray diffraction spectrum cannot be obtained. Paragraph [0848] lists suitable solvents where the organic solvent is distilled off. Paragraph [0853] lists suitable antisolvents. In particular, paragraph [0856] lists water as being a suitable antisolvent. However, according to Comparative Example 3-2 it is not possible to obtain crystals of pyroxasulfone having the claimed diffraction peaks when water is used as an antisolvent.

2.5.2 The Opponent reserves the right to rely on further particulars in support of this ground of opposition.

3 Ground 3: Section 59(c) of the Act

3.1 Lack of Disclosure

3.1.1 The opposed Application does not comply with subsections 40(2)(a) as it does not provide a clear and complete enough disclosure for the invention of claims 1 to 20 to be performed by a person skilled in the relevant art without undue burden and without needing inventive skill.

3.1.2 Without limiting the generality of the above the Opponent states as follows:

The only disclosure of a specific agrochemical composition or process falling within the scope of the claims is Example 3-A (wettable powder) and Example 3-B (aqueous suspension concentrate). There is no disclosure in the specification of water-dispersible granules and oil dispersions.

3.1.3 In view of the above the disclosure in the opposed Application is far exceeded by the claims as accepted, and the skilled person would not be able to perform the invention across the entire breath of the claims without undue burden and without needing inventive skill.

31.4 The Opponent reserves the right to rely on further particulars in support of this ground of opposition.

3.2 Lack of Best Mode

3.2.1 The opposed Application does not comply with subsection 40(2)(a)(a) as it does not disclose the best method known to the Applicant of performing the invention at the filing date.

3.2.2 There is no disclosure of the best method for the subject matter of agrochemical compositions being oil dispersions (claim 17) and water-dispersible granules (claim 9).

3.2.3 The Opponent reserves the right to rely on further particulars in support of this ground of opposition.

3.3 Lack of Definition

3.3.1 The complete specification filed in respect of the opposed Application does not comply with section 40(2)(b) because the claims do not define the alleged invention.

3.3.2 Without limiting the generality of the above the Opponent will lead evidence showing that the claims are unclear for the reasons set out in section 3.5 below.

3.3.3 The claims do not define the alleged invention because claims 1 to 4 of the opposed Application do not define when the spectrum of the crystal of pyroxasulfone having peaks at diffraction angles 2θ at least in the range of 17.7 to 17.8°, 18.0 to 18.1° and 19.9 to 20.0° in powder X-ray diffraction measurement is assessed. This is in contradistinction with the examples of the opposed Application (see Example 2-14 and Examples 3-1 to 3-12) where the X-ray diffraction spectrum is determined immediately after manufacture.

3.3.4 Further, and in the alternative, the claims do not define the alleged invention because the claims are not supported for the reasons set out in section 3.4 below.

3.3.5 The Opponent reserves the right to rely on further particulars in support of this ground of opposition.

3.4 Lack of Support

3.4.1 The specification of the opposed Application does not comply with section 40(3) because the claims are not supported by matter disclosed in the specification. Further and more specifically the claims are not consistent with what the specification as a whole describes as the alleged invention, and travel beyond the subject matter of the alleged invention as described in the specification.

3.4.2 The only agrochemical compositions supported by the disclosure are those described in Example 3-A (wettable powder) and Example 3-B (aqueous suspension concentrate). These Examples describe a mass of crystals of pyroxasulfone and a surfactant. A “crystal of pyroxasulfone” as claimed in the claims is not supported by this disclosure. Further in these Examples pulverization of the mass of crystals occurs together with a surfactant. There is no support for “a step of pulverizing a powder comprising a crystal of pyroxasulfone”. There is also no support for “a step of mixing a pulverized crystal of pyroxasulfone and a surfactant. The claims define an invention that is materially different to what is described in the body of the specification of the opposed Application.

3.4.3 The specification provides no support for a water-dispersible granule or an oil dispersion or processes for making them.

3.4.4 It follows that none of claims 1 to 20 are supported.

3.4.5 The Opponent reserves the right to rely on further particulars in support of this ground of opposition.

3.5 Lack of Clarity and Succinctness

3.5.1 The specification of the opposed Application does not comply with section 40(3) because the claims are not clear, inexact and incapable of a precise construction.

3.5.2 In the absence of clear definitions and terms and phrases in the specification, a skilled addressee would not be able to interpret or determine the scope of the claims.

3.5.3 Without limiting the generality of the above, the Opponent will lead evidence showing that the lack of clarity and/or succinctness arises in respect of at least the following:

(i) Claims 5, 9, 13 and 17 refer to a step of pulverizing a crystal of pyroxasulfone. The claim appears to indicate that this step is conducted prior to mixing with a surfactant. The only Examples in the specification to agrochemical formulations are Examples 3-

A and 3-B where the pyroxasulfone is mixed and pulverized together with the surfactant.

(ii) The meaning of “a crystal” and “the crystal” in the claims and whether this refers to a single crystal. It is noted that Examples 3-A and 3-B refer to a mass of crystals.

(ii) The meaning of a “slight amount of water” in claim 9. There is no Example of a water-dispersible granule in the opposed Application and what is meant by the phrase.

2.5 4 The Opponent reserves the right to rely on further particulars in support of this ground of opposition.

The Opponent Seeks the Following Relief

(i) The refusal to grant a patent in the opposed Application;
(ii) The costs of this proceeding; and
(iii) Any other such relief that the Commissioner may deem appropriate.

The Opponent reserves the right to amend the Statement of Grounds and Particulars as further relevant details come to hand.

My address for service is as follows:

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AUSTRALIA

2 April 2025

Dated

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