Examiners' Report Paper B 2010 (Chemistry)

Introduction:

The application defines leads for coloured pencils and methods making them. The application in particular seeks to provide leads which are erasable. This problem is stated to be solved by the use of leads with a content of at least 20% by weight of hexagonal boron nitride or mica.

The prior art document D1 discloses pencil lead compositions containing a filler, a binder, a lubricant, a dispersant and a pigment as well as a bittering agent. The composition may contain hexagonal boron nitride or mica as fillers. The composition in the example had a mica content of 30% by weight. The lead was made by kneading together all of the ingredients with a minimum of water. The paste produced was then extruded to make the leads. The extruded leads were dried at a temperature of 120-150°C for 1 hour. The document notes that leads containing about 30 wt% hexagonal boron nitride or mica leave marks which are easy to erase. This document was consequently novelty destroying for claims 1 and 3 of the application.

Document D2 discloses a pencil containing a lead comprising a binder, a lubricant, a dispersant and a pigment. The filler used was mica in an amount of 50-70 wt.%. In the example mica was used at 65 wt.% of the total composition. The lead was made by kneading together all of the ingredients with a minimum of water. The paste produced was then extruded to make the leads. The extruded leads were dried at a temperature of 110-120°C within 2 hours. Document D2 is thus also novelty destroying for the subject-matter of claims 1 and 3.

The applicant’s letter in addition set out a composition intended to be used by a potential licensee to make pencil leads. This composition was as follows: Titanium dioxide 30-40% + hexagonal boron nitride or mica 20-30%
Binder: methyl cellulose 6.7% + benzaldehyde (cross linking agent) 0.3%%
Dispersant: sorbitan ester 1%
Lubricant: stearic acid 7% and carnauba wax 5%
It was clear from this letter that any amendments made should ensure that this composition is still covered by the claims.

Independent product claim (35 marks):

Two main possibilities are available to the candidate to render the claimed subject-matter novel and inventive with respect to document D1; the use of a cross-linked binder or the selection of a wax-free lubricant. The composition could also be rendered novel with respect to document D1 by excluding optional components such as bittering agents. It is however difficult to argue that such compositions would be inventive.
Document D2 however discloses both a wax-free lubricant and a cross-linked binder and thus a further amendment is necessary. Document D2 however requires that the composition contains 50-70 wt% of mica. Thus the product can be rendered novel with respect to this document by limiting the hexagonal boron nitride and mica (or just the mica content) content to 20-45 wt% or alternatively by retaining the original content of at least 20 wt.% mica or hexagonal boron nitride and requiring that the composition contains a metal oxide. Some candidates established the novelty with respect to document D2 by requiring that the lubricant contained a wax. It however presented significant problems to argue for the inventive step of such a claim.

A product containing a wax-free lubricant is less preferred because this would exclude the product that is to be licensed. Thus the best solution is for the candidate to limit the independent product claim to leads with binders containing a cross-linked cellulose ether and either a metal oxide or 20-45 wt% of hexagonal boron nitride or mica (This claim is worth up to 35 marks).

Any composition claim which completely excludes the composition to be licensed is worth a maximum of 10 marks (for example a claim which requires that the lubricant used in the composition contains no wax). A solution which partially excludes the composition to be licensed is worth up to 20 marks (for example claims limited to a content of hexagonal boron nitride or mica of 25-45% or claims in which the presence of mica was excluded). A solution rendered novel with respect to document D1 by specifying that no optional components are used is worth up to 5 marks.

A set of claims containing two independent claims to a composition, one made novel with respect to document D1 by being a wax free the other by the use of a cross-linking agent lacks unity of invention in the sense of Article 82 EPC. The composition claims in this case receive up to 20 marks.
Marks were also deducted if the claim contains further unnecessary limitations. Each additional limitation results in a deduction of 5 marks up to a maximum of 15 marks.

10 marks are deducted for any feature claimed which contravenes Article 123(2) EPC (for example not including the weight percentage of cross-linking agent). 5 marks are deducted for any amendment which results in a lack of clarity (for example claiming the composition of original claim 2, but with the sum of hexagonal boron nitride, mica and metal oxide being 50-70%, this requirement is incompatible with the metal oxide content of up to 60%. As usual no marks are awarded for any independent claim which lacks novelty.

The weight percentage of the cross-linking agent may be claimed as a percentage of the composition or as a percentage of the binder. The paper supports both possibilities.

Candidates submitting multiple independent composition claims such that the set of claims does meet the requirements of Rule 43(2) EPC also did not receive full marks.

Independent process claim (5 marks):

It is necessary to limit the drying temperature to a minimum of 110°C for leads containing cross-linking agent (3 marks are deducted if this amendment is not made). A deduction of 3 marks is also made if the upper limit of 150°C for the drying temperature is not present; removing the upper limit contravenes Article 123(2) EPC. For other solutions this claim should remain unchanged. In each case 5 marks are available.

Other claims (10 marks):

A total of 5 marks are available for dependent claims (1 mark per claim), which further specify preferred embodiments of features incorporated into claim 1(e.g. preferred cross-linking agents, cellulose ethers or metal oxides). A clear version of original claim 2 is awarded 2 marks. 2 marks are also available for formulating a claim to a pencil with a lead obtainable by the claimed process. Finally 3 marks are awarded for suggesting a divisional application for compositions containing no wax.

Argumentation:

Amendments (12 Marks: 8 marks for providing the basis for the amendments and 4 mar for clarity)

Added subject-matter:

A maximum of 3 marks are awarded for answers which merely list passages in the application as a basis for the amendments. The remaining marks are reserved for explaining which amendments have been made and arguing why the combinations of features introduced are disclosed in the application as filed.
The basis for claim 1 in the model set of claims is given by original claim 1 in combination with paragraph [008] which discloses the use of a cellulose ether binder containing 0.1-0.5% of a cross-linking agent. In addition paragraph [007] discloses a preferred hexagonal boron nitride or mica content of 25-45%. It is permitted to combine the broad range of at least 20% with the preferred range of 25-45% to obtain the range of 20-45% (see for example T2/81).
The two amendments made also do not introduce subject-matter, by resulting in combinations of features which the application does not disclose. The two features amended are presented as features that can be changed independently of other parameters in the application's description. The examples also support the argument that the nature of the binder and the content of boron nitride and mica can be changed independently.

The method claim is based upon original claim 3 in combination with the lower limit for the temperature range disclosed in paragraph [012]. The product by process claim 7 (see model set of claims) also has the same basis. The preferred cross-linking agents and cellulose ethers of claims 2-4 are based upon paragraph [008]. The most preferred composition of claim 5 is disclosed in paragraph [006].

Clarity:

The argumentation for clarity should make it clear how the objection to original claim 2 has been overcome.
The candidates were thus expected to explain that original claim 2 has been deleted. Claim 5 which like original claim 2 defines the whole composition of pencil lead, does not suffer from the same clarity objection because the total content of the components in this claim must not be over 100%.

Novelty (10 marks):

The argumentation for novelty is expected to include a summary of both document D1 and document D2 (3 marks each). The other 4 marks are reserved for indentifying the distinguishing feature for each document. The marks available under the heading of novelty are also awarded if a part of the expected argumentation is presented by the candidate as part of their argumentation in respect of inventive step.

Inventive step (28 marks):

The closest prior art document is D1 since this is the only document, which mentions the general problem addressed by the application of providing lead compositions with erasable marks. Justifying this selection is worth 3 marks. Therefore it is not necessary to attempt to also argue for inventive step starting from document D2 as the closest prior art.

The difference between the product claimed and that disclosed in document D1 is that it contains a cross-linked cellulose ether binder.
The objective problem solved by the present claim is to provide pencil lead compositions which further improve the erasing properties without degrading other properties significantly (4 marks). A number of candidates stated that the problem to be solved was increasing the hardness of the lead. This is however the explanation given in the application for the improved erasing properties and thus not the best way to define the problem.

The candidates are expected to discuss the evidence in the application that this problem is solved by the invention as claimed. In particular the candidates are expected to refer to paragraphs [004] in which it is explained that a harder lead is associated with better erasing properties, paragraph [008] which shows that cross-linking increases the hardness and refer to example 3 which shows that the best erasing properties are obtained with a cross-linked binder. The example also shows an increased number of rejects, but as mentioned in document D2, this is within acceptable limits (a total of 10 marks).

The discussion of the obviousness (9 marks) is expected to focus on the explanation for the improved erasing properties. The application explains this by the hardness of the leads and explains that a cross-linked binder results in a harder lead. Document D1 associates the shape of the hexagonal boron nitride or mica with the erasing properties and thus provides no incentive to select a particular binder, or to seek means for obtaining a harder lead. Document D2 mentions a cross-linked binder but does not associate this binder with the erasing properties or a harder composition. It is also not readily possible to combine these documents, since the contents of mica (or hexagonal boron nitride) suggested by these documents are incompatible with each other.

The method claim should also be very briefly discussed. In this respect it is sufficient to explain why the arguments developed for the composition claim also apply to the method claim.

The claim directed to the composition containing no wax (see model set of claims) also needs to be briefly discussed if it is to be proposed as a divisional application (2 marks). The closest prior art is also considered to be document D1. The difference is that the lubricant contains no wax. The problem solved with respect to document D1 is to reduce the wastage. The application states that using a lubricant with no wax reduces breakages. This is demonstrated in example 2. There is no suggestion in either document D1 or D2 that the lubricant used could have an effect on the properties of the lead.

The committee was pleased to note that very few candidates chose to submit notes to the examiner.

A model set of claims has the following wording:

1. Pencil lead composition comprising a cellulose ether binder, a dispersant, a pigment and a lubricant, the composition comprising 20-45 % by weight of hexagonal boron nitride or mica characterised in that the composition comprises 0.1-0.5% of a cross-linking agent.

2. Pencil lead composition according to claim 1 in which the cross-linking agent is an aldehyde or a diisocyanate.

3. Pencil lead composition according to claim 2 in which the aldehyde is selected from benzaldehyde, glutaraldehyde and glyoxal.

4. Pencil lead composition according to claim 1 in which the cellulose ether is selected from methyl cellulose, hydroxypropyl cellulose or hydroxypropyl ethyl cellulose.

5. Pencil lead composition according to claim 1 characterised in that it contains

25-35% is hexagonal boron nitride or mica
Metal oxide 15-45%
Binder: 5-10%
Dispersant: 1.0-1.5%
Lubricant: 10-20%
Pigment: 0.2-30%
with the proviso that the sum of the metal oxide, hexagonal boron nitride and mica contents is 50-70%.

6. A method for making a pencil lead with a composition according to claim 1 comprising the steps of kneading together all of the ingredients with a minimum of water to make a paste, extruding the paste to make the leads and drying the extruded leads at a temperature of 110-150°C for 1-4 hours

7. Pencil containing a lead obtainable by the method of claim 5.

The independent product claim for the divisional application may be worded as follows:

1. Pencil lead composition comprising a cellulose ether binder, a dispersant, a pigment and a lubricant containing no wax, the composition comprising 20-45 % by weight of hexagonal boron nitride or mica

EXAMINATION COMMITTEE I

Candidate No.

Paper B (Chemistry) 2010 - Marking Sheet

Category		Maximum possible	Marks awarded	
			Marker	Marker
Claims	Product	35		
	Method	5		
	Other claims	5		
	Dependent claims	5		
Arguments	Amendments	12		
	Novelty	10		
	Inventive Step	28		
Total		**100**		

Examination Committee I agrees on ..... marks and recommends the following grade to the Examination Board:

☐ PASS (50-100)

☐ COMPENSABLE FAIL (45-49)

☐ FAIL (0-44)

01 July 2010

Chairman of Examination Committee I