DECISION

Accepted for publication – Requires Major Corrections. Hence the authors should alter the text to satisfy with the following requests.

GENERAL COMMENT FOR THE SUBMITTED ARTICLE

The paper presents in a clear and concise form the results of an interesting study of practical importance. The evaluation of the paper is strong.

However, the paper should be improved and provide answers to questions that arise on the cumulative mineralizing effect of secondary sources of minor elements contained in the alternative raw materials (tephritic basalt and lead slag) in the form of cations (Zn, Cu, Ti, Cr, Pb) and anions (Cl) in the raw mix and their influence on the hydration and not only on the physical & mechanical properties of the produced composite cement. Hence, the additional potential of the proposed work should be highlighted in the text, that is related with the environmental benefits if exploitation of tephritic basalt and lead slag wastes will occur.

Additions on the provided references should be conducted.

GENERAL GUIDELINES

It would be advisable that the Authors will proceed with the selection of a new, shorter and much more felicitous paper title.

COMMENTS ON SPECIFIC PARTS OF THE SUBMITTED ARTICLE

Introduction: Provides a clear statement of the problem, the proposed approach or solution and an adequate review of the literature, but needs crucial additions, especially on the individual as well as the combined, mineralizing effect of all indirectly minor elements introduced on clinker sintering and secondary raw materials (minerals, wastes, by-products etc.) that have been used for the same purpose.
Comments from the relevant bibliography in the field should be added and comparisons with the present work has to be done.

Experimental: Approved and described analytically. However, for the clarification of results, it would be advisable that further tests should be conducted (EDXS SEM, volatility tests for the assessment of the incorporation of mineralizing elements in clinker phases, hydration tests) and commented in the revised text.

Results and Discussion: Adequate but questions have arisen and should be answered.

Conclusions: Adequate and well-presented but some extras are required.

References: Adequate but additional references are required. References No. 1, 2, 3, 17, 18, 19, 21, 23, 26, 28, 36, 38, 42, 43 should be deleted since they are irrelevant and have nothing to offer with the subject.

QUESTIONS-COMMENTS

The following questions-comments have been arisen that need to be answered:

1. An SEM-EDXS study should be conducted of the elemental mapping of all minor cations (Ti, Cr, Zn, Cu, Pb) and anions (Cl) with the well-known mineralizing effect in clinker phases. This is crucial for the clarification of microstructure alterations on mineral phases for the completeness of the study, since there are mixes of more than two of these minor elements in low but not negligible percentages in the raw meal and is rather hard to elucidate their share to the final result. Additionally, comparisons have to be done with relevant literature concerning their findings, otherwise without the comparison with relevant references, by using all these expressions in the text, the authors are only surmising that things are in that way.

2. The above are crucial since there is no clarification on the burnability of the raw meal used in comparison to the volatility of the minor elements that has not been assessed by specialized tests (especially for Pb should be measured), neither the EDXS elemental mapping. Hence the effect of the improved burnability of the modified raw mix cannot be elucidated and a reduction of 100°C on the clinkerization temperature should be correctly justified (p.e. to elucidate the mechanisms of selective formation of monoclinically modified M1 alite in modified clinker with lower clinkerization temperature, both synthetic as well as conventional OPCC raw mix). According to the reviewer's opinion the mineralizing effect can be attributed to the synergistic action of Zn and Cu as a mineralizing mix but proofs required for that assumption.

3. XRD identification was not properly characterized by the authors, as minor elements like Zn, Cu and Pb at the concentrations measured should have formed crystalline compounds in the interstitial phase (especially Cu) which have not been detected. A better reading of the diagrams with references for findings and comparison with the relevant literature has to be carried out. Since the XRD patterns for the microstructure of the hydrated cements & hydrated products and generally for the hydration evolution were not supplied, there are only indications and not proofs about the existence of the crystalline compounds mentioned.

4. There are no experimental tests on the hydration of the produced modified cements and on how they perform during hydration. There is no evidence on the microstructure of hydrated products and on the effect of the additions on the initial and final hydration times, in the presence of Zn, Cu, Pb, Ti and Cr. This has to be commented in the first place as the effect of

the above minor elements in cement's hydration is well-known, extensively reviewed and presented in the literature.

5. References No. 1, 2, 3, 17, 18, 19, 21, 23, 26, 28, 36, 38, 42, 43 should be deleted since they are irrelevant and have nothing to offer with the subject

ADDITIONAL COMMENTS

The potential use of corrected binary mixes of the two by-products with different varying proportions could result, perhaps, to more interesting results. However, this may be the subject of a further investigation that is worth to conduct. Comments with regards to the above thoughts should appear in the revised text.