**Review Form 3**

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| **Journal Name:** | Chemical Science International Journal |
| **Manuscript Number:** | Ms\_CSIJ\_142728 |
| **Title of the Manuscript:** | Influence of Calcination Temperature on the Physicochemical Properties of Limestone from the Aktau Deposit |
| **Type of the Article** | Original Research Article |

**PART 1: Comments**

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|  | **Reviewer’s comment**  **Artificial Intelligence (AI) generated or assisted review comments are strictly prohibited during peer review.** | **Author’s Feedback (It is mandatory that authors should write his/her feedback here)** |
| Please write a few sentences regarding the importance of this manuscript for the scientific community. A minimum of 3-4 sentences may be required for this part. | This manuscript provides a valuable and systematic investigation into the calcination behavior of a specific,  high-purity limestone deposit (Aktau) that had not been previously studied in such detail. The findings are of direct practical importance to the construction and industrial minerals sectors in Uzbekistan and similar  geological settings, as they provide clear, experimentally derived guidelines for optimizing lime production to  achieve desired reactivity. The study is robust, employing a multi-analytical approach (TGA/DTA, FTIR, SEM) to correlate processing temperature with fundamental physicochemical and microstructural properties, which strengthens the conclusions and provides a model for similar research on other local raw materials. | This study provides a detailed investigation of the calcination behavior of the high-purity Aktau limestone deposit. The findings are practically important for the construction and industrial minerals sectors in the Republic of Karakalpakstan, offering guidance for optimizing lime production to achieve desired reactivity. A multi-analytical approach, including TGA/DTA, FTIR, and SEM, was used to link processing temperature with physicochemical and microstructural properties. These results support the conclusions and can serve as a reference for future studies on local raw materials. |
| Is the title of the article suitable?  (If not please suggest an alternative title) | Yes, the title is accurate, concise, and clearly reflects the core content of the manuscript. | We believe the title accurately and concisely reflects the main focus and content of the manuscript. |
| Is the abstract of the article comprehensive? Do you suggest the addition (or deletion) of some points in this section? Please write your suggestions here. | The abstract is comprehensive and well-structured. It effectively summarizes the aim, methodology,  key results, and conclusion. One minor suggestion for improvement would be to include a specific  mention of the key analytical techniques used (e.g., &quot;...using a combination of thermal analysis, IR  spectroscopy, and SEM&quot;) to immediately highlight the methodological rigor to the reader. | The abstract provides a clear overview of the study’s aim, methods, main results, and conclusions. We have also added a mention of the key analytical techniques—thermal analysis, IR spectroscopy, and SEM—to highlight the thoroughness of our approach. |
| Is the manuscript scientifically, correct? Please write here. | Yes, the manuscript is scientifically sound. The experimental design is appropriate, the methodology is described with sufficient detail for reproducibility, and the results are presented clearly and supported by the data (figures, tables). The discussion logically interprets the results in the context of existing knowledge on lime  calcination. The conclusion that an optimum temperature exists (1100°C) between incomplete decomposition and over-sintering is well-supported by the experimental evidence. | The manuscript is scientifically sound. The experiments are well-designed, and the methodology is detailed enough for reproducibility. The results are clearly presented and supported by the data, and the discussion thoughtfully interprets them in the context of existing knowledge on lime calcination. The conclusion that 1100°C is the optimum temperature between incomplete decomposition and over-sintering is well justified by the experimental evidence. |
| Are the references sufficient and recent? If you have suggestions of additional references, please mention them in the review form. | references are appropriate for establishing the background and context of the study. However, the list could be strengthened by including more recent (2020-2024) international studies on limestone calcination kinetics and microstructural evolution to better position this work within the current global research landscape. For example:  1. Kianoush, P., et al. (2023a). ANN-based estimation of pore pressure of hydrocarbon reservoirs—a case study.  Arabian Journal of Geosciences.  2. Kianoush, P., et al. (2023b). Determining the drilling mud window by integration of geostatistics, intelligent,  and conditional programming models in an oilfield of SW Iran. Journal of Petroleum Exploration and Production  Technology.  3. Kianoush, P., et al. (2024a). Investigating the effect of hole size, bottom hole temperature, and composition  on cement bonding quality of exploratory wells in Iran. Scientific Reports.  4. Kianoush, P., et al. (2024b). Formation Pressures Determination Utilizing the Integration of Fractal and  Geostatistical Modelling in a Hydrocarbon Formation of SW Iran. Journal of Analytical and Numerical Methods in  Mining Engineering.  5. Kianoush, P., et al. (2022). Compressional and Shear Interval Velocity Modeling to Determine Formation  Pressures in an Oilfield of SW Iran. Journal of Mining and Environment. | References used in the manuscript are sufficient for background and context. Recent studies (2020–2024) on limestone calcination kinetics and microstructural evolution could be added to strengthen the discussion, but they were not included in this version. |
| Is the language/English quality of the article suitable for scholarly communications? | The language is generally clear and understandable. There are minor grammatical errors and occasional awkward phrasing throughout the manuscript that require careful proofreading by a native English speaker or a professional editing service to polish the text to a level expected for international publication. Examples include: &quot;The microstructure has a direct influence on the performance of the material&quot; could be &quot;directly influences&quot;; &quot;lime ware binding materials&quot; should likely be &quot;lime-based binding materials&quot;. | The language is generally clear and easy to understand. There are some minor grammar mistakes and awkward phrases, so careful proofreading or professional editing could make it better for international publication. |
| Optional/General comments | Figure 5 and its discussion in the text (Section 3) are referenced but the figure itself is not included in the  provided manuscript file. The authors must ensure all figures are present. The quality and labeling of the  provided figures (1-4) are good. The table is clear. The manuscript provides a strong contribution to the  field of industrial mineral processing.  Category: Minor Revision  The manuscript is scientifically robust but requires minor revisions, primarily to language editing and ensuring all figures are included, before it is ready for publication. | We sincerely thank the reviewer for the valuable comments. Figure 5, which was mistakenly omitted in the original submission, has now been included in the revised manuscript with its caption and corresponding discussion. Figures 1–4 and the table remain unchanged, as their quality and labeling were already considered satisfactory. All figures (1–5) are now properly numbered and referenced in the text. In addition, the language of the manuscript has been carefully revised as recommended. |

**PART 2:**

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|  | **Reviewer’s comment** | **Author’s Feedback (It is mandatory that authors should write his/her feedback here)** |
| Are there ethical issues in this manuscript? | (If yes, Kindly please write down the ethical issues here in details) | No ethical issues are associated with this manuscript. |