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REVIEWER'S REPORT

Manuscript No.: **IJAR-52470** Date: 27-06-2025

Title: Low-temperature ashing for Z0, Z1 and Z2 Tarfaya (Morocco) oil shale layers, followed by acid etching to prevent physical and chemical effects

Recommendation:
Accept as it is .....
Accept after minor revision.....
Accept after major revision .....
Do not accept (*Reasons below*) .....

Rating	Excel.	Good	Fair	Poor
Originality			✓	
Techn. Quality		✓		
Clarity			✓	
Significance		✓		

Reviewer Name: Mir Tanveer **Date:** 26-06-2025

Reviewer's Comment for Publication.

General Evaluation:

This manuscript presents an experimental investigation into the reactivity of Tarfaya (Morocco) oil shale layers (Z0, Z1, and Z2) using low-temperature ashing (LTA) followed by acid etching. The study is grounded in understanding the interaction between thermal effects and chemical reactivity, particularly with respect to the preservation of mineral matrices during organic matter removal. The approach is relevant for improving our understanding of oil shale processing and compositional analysis, with implications for both laboratory characterization and potential field applications.

Abstract Evaluation:

The abstract is clear in presenting the primary objectives, methods, and scientific context of the study. It outlines the use of isothermal combustion (ambient to 300°C) and subsequent acid

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treatment to examine reactivity trends in the shale layers. The summary effectively highlights the interplay between material decomposition and thermal treatment. The citation of previous related work offers a helpful reference point. The abstract is technically sound and appropriately scoped.

Introduction Evaluation:

The introduction provides a concise yet informative overview of oil shale formation, establishing the geological and geochemical significance of the resource. The explanation of oil shale as "the rock that burns" effectively captures the practical essence of the material. The section also sets up the scientific motivation for the study by noting the similarities and differences between oil shale and conventional hydrocarbons in terms of formation conditions. The background establishes a meaningful context for the experimental work.

Literature Review Evaluation:

The literature review offers a valuable historical perspective on oil shale oxidation and thermal behavior. The inclusion of multiple key studies from the 1960s to 1970s demonstrates a thoughtful engagement with foundational research. The contrast between the thermal responses observed by different authors adds depth to the discussion and substantiates the necessity of the current study. The review clearly supports the experimental rationale by identifying gaps or unresolved mechanisms in prior work.

Methodological Consideration:

The use of low-temperature ashing to preserve the integrity of inorganic phases while removing organics is scientifically justified. The strategy of subsequent acid etching followed by pH-meter monitoring represents a systematic approach to characterizing chemical reactivity. The focus on isolating thermal effects and reaction mechanisms is a strength of the design. The referencing of a prior related study (Attaoui et al., 2022) also reinforces the methodological foundation.

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Scientific Significance and Application:

The work addresses important aspects of oil shale processing, including compositional analysis and the understanding of thermochemical interactions. The regional focus on the Tarfaya deposit adds local geological relevance while contributing to the broader body of knowledge on oil shale behavior. The investigation into acid attack reactivity following controlled combustion steps provides insight that could influence both academic understanding and industrial methodology.

Conclusion and Overall Impression:

The manuscript presents a well-framed and technically competent study on the behavior of Moroccan oil shale under thermal and chemical treatment. It aligns with broader interests in unconventional hydrocarbon resources and contributes to ongoing discussions about oil shale characterization and processing methods. The clarity of expression, scientific grounding, and logical progression of ideas strengthen the overall impact of the work.
