



A Preliminary Study on Energy Production by Fluidized Bed Combustion Using Jordanian Oil Shale



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Motivation

Studying the effect of the Jordanian oil shale particle size on the temperature distribution within the combustion chamber using a circulating fluidized bed technique

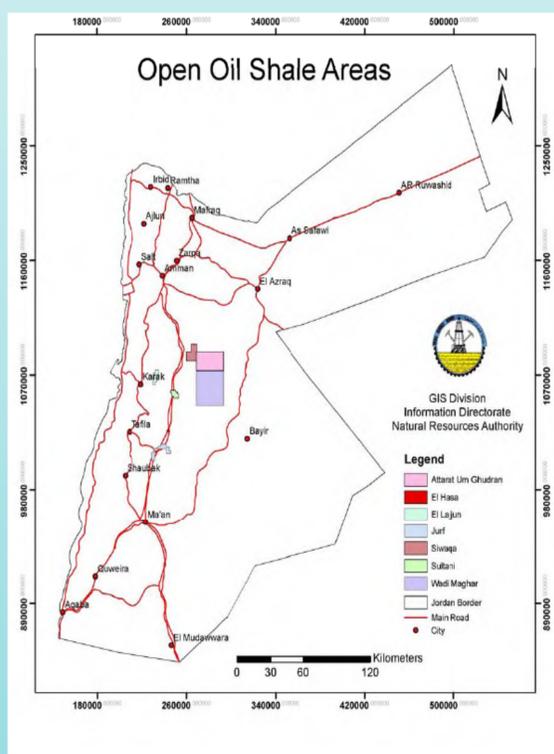
Introduction

Jordan is totally dependent on imported crude oil and petroleum products to meet all its energy requirements.

Jordan possesses a very large energy resource in its vast reserves of oil shale; over 50 billion tons of geological reserves. There are 26 known locations near surface and deep deposits of oil shale occurrences that have been reported in most of the Jordanian region.

The geological studies and exploration for water, oil, and minerals showed that oil shale is widely distributed in many parts of the country as shown in Fig. 1.

Fig. 1: Location map of oil shale occurrence in Jordan



Experimental work

The experimental setup is shown in Fig. 2.

The oil shale brought from the El-Lajjun deposit was crushed and sieved to four particle size ranges between 75-600 μm .

Particle size ranges investigated in this work:

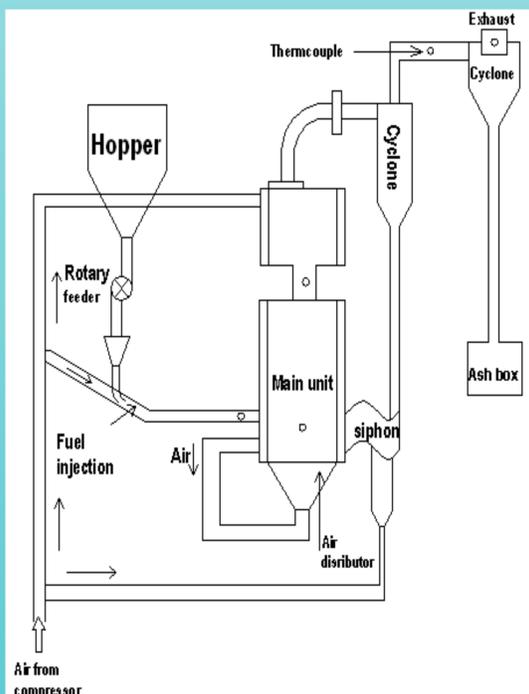
75 – 150 μm

150 – 300 μm

300-500 μm

500-600 μm

Fig. 2: Experimental test rig



Results & conclusions

The results obtained show that the Jordanian oil shale can be burned continuously and efficiently with an average bed temperature of 647 $^{\circ}\text{C}$.

The optimum particle size was in the range of 75 - 150 μm . The largest particle size used (500-600) μm produces the highest exhaust gas temperature.

Oil shale utilization in Jordan should be pursued because it will result in significant savings in foreign exchange, improving Jordan's economy and creating new jobs.

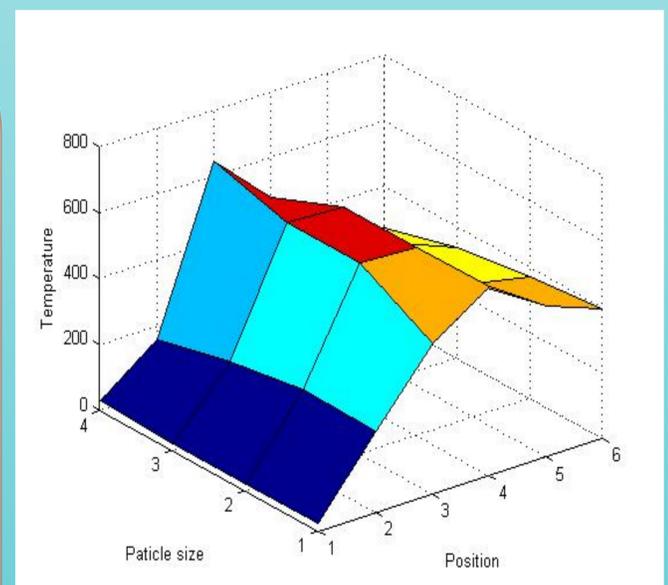


Fig. 3: 3-D representation of the temperature variation with position and particle size

References: [1] J. Al-Ali and S. Swaged, 2006, Report of National Resources Authority (Oil Shale Resources Development in Jordan).

[2] X.M. Jiang, X.X. Han, and Z.G. Cui, Progress and recent utilization trends in combustion of Chinese oil shale, Progress in Energy and Combustion Science 33 (6), 2007, 552-579