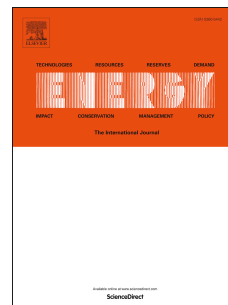


# Accepted Manuscript

The mechanism of the terahertz spectroscopy for oil shale detection

Honglei Zhan, Mengxi Chen, Kun Zhao, Yizhang Li, Xinyang Miao, Haimu Ye, Yue Ma, Shijie Hao, Hongfang Li, Wenzheng Yue



PII: S0360-5442(18)31409-9

DOI: [10.1016/j.energy.2018.07.112](https://doi.org/10.1016/j.energy.2018.07.112)

Reference: EGY 13377

To appear in: *Energy*

Received Date: 14 February 2018

Revised Date: 9 June 2018

Accepted Date: 17 July 2018

Please cite this article as: Zhan H, Chen M, Zhao K, Li Y, Miao X, Ye H, Ma Y, Hao S, Li H, Yue W, The mechanism of the terahertz spectroscopy for oil shale detection, *Energy* (2018), doi: 10.1016/j.energy.2018.07.112.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

# The mechanism of the terahertz spectroscopy for oil shale detection

Honglei Zhan<sup>1,2,3,\*</sup>, Mengxi Chen<sup>2,†</sup>, Kun Zhao<sup>1,2,3,\*</sup>, Yizhang Li<sup>2</sup>, Xinyang Miao<sup>2</sup>, Haimu Ye<sup>3</sup>,  
Yue Ma<sup>2</sup>, Shijie Hao<sup>3</sup>, Hongfang Li<sup>3</sup>, Wenzheng Yue<sup>1</sup>

<sup>1</sup>*State Key Laboratory of Petroleum Resources and Prospecting, China University of  
Petroleum, Beijing 102249, China;*

<sup>2</sup>*Beijing Key Laboratory of Optical Detection Technology for Oil and Gas, China  
University of Petroleum, Beijing 102249, China;*

<sup>3</sup>*Department of Material Science and Engineering, China University of Petroleum,  
Beijing 102249, China*

<sup>†</sup> *These authors contributed equally to this work*

*\* Corresponding authors: zhanhl@cup.edu.cn; zhk@cup.edu.cn*

## ABSTRACT

Terahertz time domain spectroscopy (THz-TDS) can directly detect oil shales. The absorption coefficient is related to the oil content in the rock. This value can be compared across regions to measuring the oil content in the oil shale. Here we studied three regions and included scanning electron microscope (SEM) and thermogravimetric analysis (TGA) to verify the amount of kerogen within oil shale prior to the constitution of the mineral matrix via the THz response. Aromatic and the aliphatic compounds contribute to the absorption of shales in the THz range due to the relatively high intramolecular interactions—this reveals the mechanism of THz radiation penetration through shales as reported in previous reports. The differences in quantum structure of a molecule between organic and inorganic materials suggest that THz-TDS can be applied to geophysical prospecting and improve the effectiveness of the detection of organics in oil shale.

Keywords: Oil shale, Terahertz spectroscopy, aliphatic compounds, kerogen.

Download English Version:

<https://daneshyari.com/en/article/8070841>

Download Persian Version:

<https://daneshyari.com/article/8070841>

[Daneshyari.com](https://daneshyari.com)