



SDI Review Form 1.6

PART 1:

Journal Name:	British Journal of Applied Science & Technology
Manuscript Number:	2013_BJAST_3790
Title of the Manuscript:	Identification of the Constituents of Crude Oil from Adaril Oil Well Using Laser Induced Breakdown Spectroscopy

General guideline for Peer Review process is available in this link:

(<http://www.sciencedomain.org/page.php?id=sdi-general-editorial-policy#Peer-Review-Guideline>)

- This form has total 7 parts. Kindly note that you should use all the parts of this review form.



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PART 2: Review Comments

	Reviewer's comment	Author's comment (if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)
Compulsory REVISION comments	It is a very interesting subject. Composition of crude oil is very important for refining process, since poisoning of used catalyst, could be minimized if we know the composition. This laser technique is very convenient for such a complicated matrix. The authors show a good management of the method. However, some issues have to be taken into account and they are included in the attached document.	
Minor REVISION comments	THE AIM of the study described in this manuscript is using Laser Induced Breakdown Spectroscopy (LIBS) to identify THE 32 CONSTITUENTS of CERTAIN TYPE of Sudanese crude oil. THE TITLE IS: "Identification of the Constituents of Crude Oil from Adaril Oil Well Using Laser Induced Breakdown Spectroscopy" Comment: From the title, we expect a wide map of constituents of the crude oil matrix. From the aim we can infer that the focus of the study is just using the analytical method for elemental analysis, no matter the nature of the sample. Suggestion: It is important either making clear the actual purpose of the research or rewrite the title. As an example, the title could be "Laser Induced Breakdown Spectroscopy applied to elemental analysis using samples of Crude from Adaril Oil". This means that the objective is not the crude chemistry itself but the usefulness of the technique in that kind	DONE



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of such a complicated matrix. Otherwise, a deeper study of the crude composition should be done.

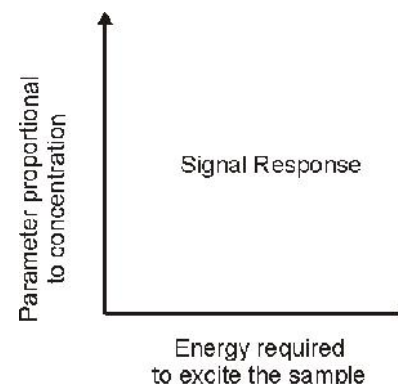
THE INTRODUCTION:

Comment: It is important enable all reader interested in the crude composition but ignorant of the used analytical technique, to understand a minimum of the mathematics involved for quantification.

For any analytical technique, for quantification,

it is necessary to relate the corresponding parameter that is proportional to the concentration of species under study.

For LIBS, the irradiance is an important parameter regarding the effects caused by the laser interaction with the sample and plasma evolution.



The average irradiance of a typical collimated pulsed laser beam at the focusing area (beam waist) is given by:

$$I_f = \frac{\pi E_L D^2}{4\tau_L f^2 \lambda^2 (M^2)^2}$$

I_f = irradiance (usually expressed in W m^{-2})

E_L = energy of the laser pulse

D = diameter of illuminated aperture of the focusing lens (or the laser beam diameter)

τ_L = pulse duration

f = lens focal length

DONE



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	λ is the laser wavelength M_2 = beam propagation ratio For a beam ideally Gaussian, M_2 is equal to 1. Typical values for beams produced by Nd: YAG lasers are between 2 to 10. <i>Fluence</i> is the time integrated value in J m^{-2}. <u>Suggestion:</u> It is necessary, at the end of the introduction, the inclusion of the math expression for quantification. EXPERIMENTAL: Data treatment seems to be very simple for this method. THE SEVERE EFFECTS OF THE SAMPLE MATRIX CAN BE OVERCOME BY EMPLOYING MATCHED STANDARDS, while THE LACK OF REPRODUCIBILITY OF THE EMISSION INTENSITY ASSOCIATED WITH INSTRUMENTAL VARIATIONS CAN BE CORRECTED BY THE USE OF AN INTERNAL STANDARD, where intensity ratios (analyte/internal standard) are used to construct the analytical curve instead of absolute peak heights. <u>Comments:</u> I cannot see in the text, description of the use of standard sample from similar nature, to compare matrix effect (it is important to remember that crude oil is a very complicated matrix). <u>Suggestion:</u> The authors have to make clear that nothing is interfering during the measurements and that at least a minimum treatment of the sample has been done (cleaning, drying etc.). RESULTS AND DISCUSSION: Figures have very poor look: We can see in these two figures as examples (all have the same problem). Axes are illegibles	DONE
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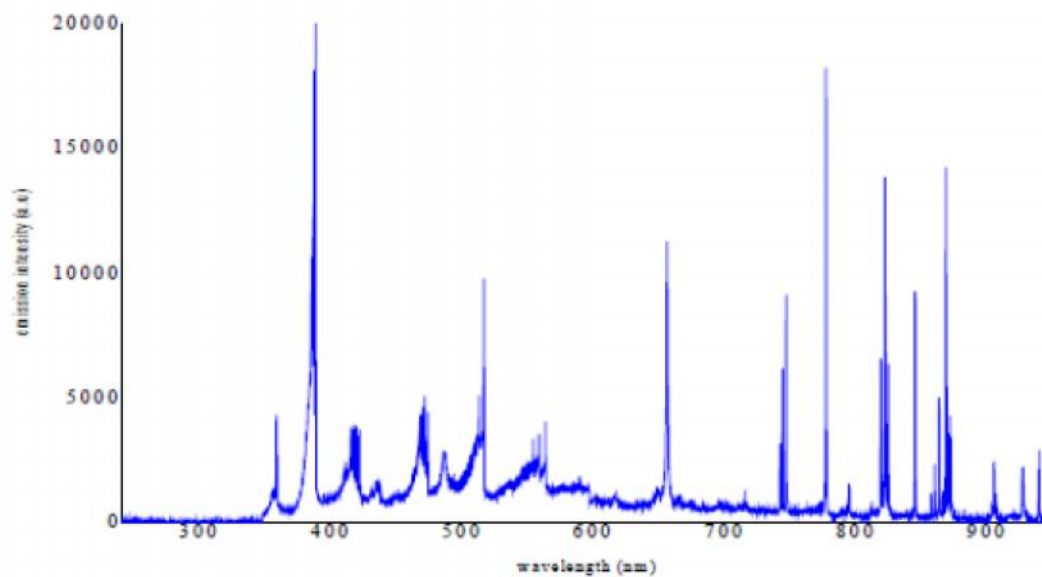


Fig. 2. Typical LIBS emission spectrum of the crude oil (Adaril A) sample

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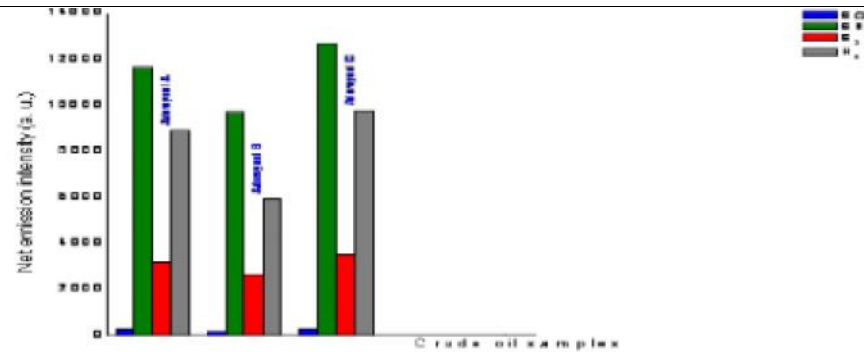


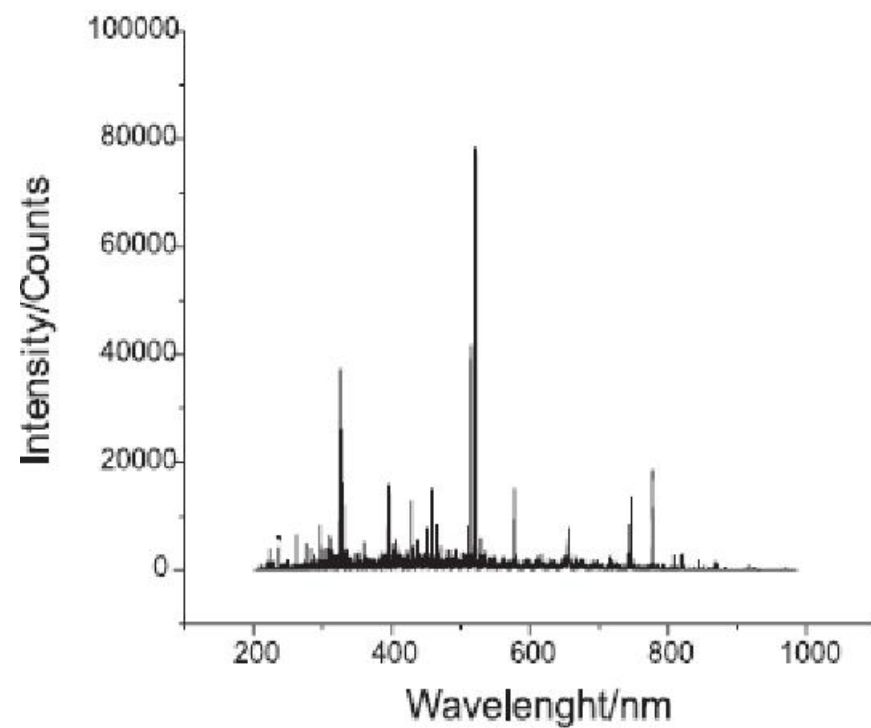
Fig. 5. Mean intensity (n=50) of the most significant emission signals exhibited by LIBS spectra from crude oil samples

Suggestion: Figures should be improved. They should look like the figure below (that we could read numbers and characters):

DONE



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Optional/General
comments

I consider that it can be published with minor corrections.