



## The Novel Method for Measurement of Sulphur in Petcoke from Crude Oil

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### Introduction

Petroleum coke (Petcoke) is marketed as per standard specification or in line with customer specification. There are different grades of petcoke like soft coke, granular, shot coke, fuel grade coke etc. The sulphur concentration in petcoke is a very important parameter for customers due to stricter environment norms. Most of petroleum the refiner estimate petcoke sulphur based on delayed coker unit feed sulphur multiply with fix factor or empirical formula based on the past experience. However many times refinery produce unplanned high sulphur petcock while processing more sour crude or quality give away in petcoke sulphur (very less sulphur compared to specification limit) while processing of sweet crude oil.

When unplanned high sulphur petcoke produced, refinery faces many problems like (a) material offtake when sulphur is beyond the specification limit resulting in shortage of committed product to the customers, (b) needs extra storage facility and more time for disposal. To avoid unplanned high sulphur petcoke production, refinery has to process low sulphur crude which is more costly leading to loss in profit margin.

The high sulphur in petcoke, quality give away in petcoke sulphur and dent in profit could be avoided if the advance information available on sulphur in petcoke, but there is no such method available or know to us.

Nayara Energy R&D team has addressed these issues innovatively and after comprehensive research work, team has developed a novel method for measurement of sulphur in petcoke from crude oil and petroleum residue samples using latest instrumental technique. The test results are accurate and correlate with actual sulphur in petcoke produce through delayed coker unit.

Development and validation of a method for determination of sulfur via CS molecule in petroleum green coke samples by high resolution continuum source molecular absorption spectrometry (HR-CS MAS) is the aim of this work. The protocol adopted for the method validation followed criteria based on international guidelines.

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The protocol adopted for the method validation followed criteria based on international guidelines. Optimizations and determination of the analyte in the samples were carried out at the wavelength 258.0330 nm, at the same spectral interval of the analytical line of Tl.

The advance information of sulphur in petcoke will be useful for,

- a) Production of petcoke with very close to sulfur specification which will avoid unplanned high sulphur as well as reduce chance of quality give away.
- b) Refiner can plan and produce low sulphur grade petcoke for better price realization.
- c) Selection, procurement and processing of more sour crude oils which are cheaper.
- d) Preparation of crude blends correctly.

Looking to the multiple benefits of research work, it is envisaged that, it will be highly useful for petroleum refining fraternity.

Keywords: Crude oil, Petcoke, Sulphur, Petcoke Sulphur, Delayed Coker Unit, Crude Distillation Unit\*

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