

The novel method for measurement of sulphur in petcoke from crude oil

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Abstract

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.

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

- a) Productions 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.

Petroleum coke is a byproduct of the oil industry's coker process. It is also known as "green coke" or "green petroleum coke" in its unprocessed form. Calcined petroleum coke is an essential industrial commodity that connects the oil and metallurgical industries by providing a source of carbon for various metallurgical uses such as the production of anodes for aluminium pot liners and graphite electrodes. The majority of petroleum coke is calcined in rotary kilns. We provide some of the characteristics of the petroleum coke calcination process in the rotary kiln and utilise this as a design case study for sizing a rotary kiln for the aforementioned application.

Petroleum coke is thus a highly versatile and useful blending fuel that may be used not only in traditional cyclone, PC, and fluidized bed boilers, but also in gasification systems, as a feedstock for metallurgical coke for the steel industry, and as a base fuel in coke-water or coke-oil slurries. With increased production of this refinery by-product as a result of rising gasoline demand, availability and utilisation will rise.