Fuel Desulfarization Using Adsorbents

INVENTION

This invention is a method of reducing concentration of sulphur compounds from fuel using an adsorbent made carbonaceous material doped with nanoparticles of aluminium oxide.

The absorbent is composed of nanoparticles of aluminium oxide doped with carbonaceous material consisting of activated carbon, carbon nanotubes and graphene oxide in certain fixed proportion by weight.

MARKET NEED

Sulphur present in fuels is discharged as sulphur oxide when fuels are combusted. These sulphur oxides are harmful when released in the environment.[1]

- 18.73 billion in 2016 and is projected to expand at a CAGR of 6.0% over the period of 2016-2020
- Flue Gas desulfurization is a growing market in India & China given environmental regulations on discharged gas

APPLICATIONS

Removal of sulfur compounds from Motor oil, jet fuel, diesel fuel. Following Sulphur compounds can be removed:

- Benzothiophene (BT)
- Alkyl-benzothiophene (alkyl-BT)
- Dibenzothiophene (DBT)
- Alkyl-dibenzothiophene (alkyl-DBT)
- Thiophene

ADVANTAGES

- Adsobent material can be regenerated for multiple uses by simply heating it at 150° C
- Using Aluminium oxide nano particles doped with multiwalled carbon nanotubes increases the absorption surface by more than 100% than using pure aluminium oxide.
- Preparation of process such adsorption material is simple.

PROJECT STATUS

- A small-scale lab prototype was tested by designing fluidized bed reactors.
- Single stage process tested using a batch method.

PATENT PROTECTION

Three issued U.S. patents 9663723, 9862895, 10005967 and three U.S. pending patent applications 15/991709, 15/660179, 15/991627 cover the technology.

The Intellectual Property is owned by King Fahd University of Petroleum & Minerals (KFUPM).

ABOUT KFUPM

KFUPM is a leading educational organization for science and technology. KFUPM Innovation & Industrial Relations is the IP management and technology licensing office tasked with taking innovation from lab to market place.

For further information please contact:
Name: Tayyab Mujahid
Email: tayyabm@kfupm.edu.sa
Telephone: +966-13-860-8360

[1] Frost & Sullivan, Flue Gas Desulfarization