Thermally and microwave-irradiated exfoliated graphite for oil spill remediation

Overview

Every year with new events of oil spills has increased the need of finding a solution for this worldwide issue. This causes excess amounts of loss of oil, aquatic habitats, loss of gallons of water, and economic resources too. With daily achievement of new materials for oil remediation dispersants, absorbents, solidifiers, booms and skimmers in the market, exfoliated graphite has been found to be the best oil absorbent in oil spill absorption and recovery. This kind of materials shows porosity and ability to absorb oil in the presence of water selectively. Heavy oils sorption into the exfoliated graphite could be recovered either by a simple compression or suction filtration with a recovery ratio of 60–80 %. The bulk density of exfoliated graphite (EG) and viscosity of oil are the major influencing factors on absorption kinetic characteristics. The EG with the bulk density of 10 kg/m^3 has a little less sorption capacity (about 70 g/g).

Various types of oils (Hydraulic, Engine, Diesel, Shell SAE 90, Shell SAE 140, and Transformer Oil) with different viscosity were tested in order to know the amount of sorption happening over exfoliated graphite.
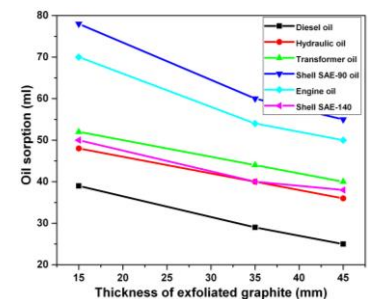
Key Features

- Highly porous with very less density
- Nearly 300 % expansion
- Selectively absorb oil in oil-water mixture
- Hydrophobic in nature
- Binder-free compaction
- Continuous bulk production

Oil absorption over microwave-exfoliated graphite

Potential Applications

- Oil remediation
- Nano grease
- Oil based thermally conductive ink
- Nanolubrication

Oil absorption performance characteristic of oil with different viscosity

Intellectual Property Development Indices (IPDI)

- Oil absorption is validated at laboratory scale
- Continuous production of exfoliated graphite
- Oil absorption unit is established for demonstration

Status	1	2	3	4	5	6	7	8	9	10