CARBONISATIONS OF COTTON-LIKE FIBERS FROM *Ceiba Pentandra L.Gaertn* TREE FOR OIL ABSORBENTS

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SCHOOL OF OCEAN ENGINEERING
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THESIS CONFIRMATION AND APPROVAL

This is acknowledged and confirmed that thesis entitled Carbonisations of Cotton-Like Fibers from *Ceiba Pentandra L. Gaertn* Tree for Oil Absorbents by Normaisarah binti Yunos (S39215) has been checked and all the suggested corrections have been done. The thesis is submitted to School of Ocean Engineering, Universiti Malaysia Terengganu in partial fulfillment of the requirements for the award of the degree of Bachelor of Applied Science (Electronics and Instrumentation Physics).

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I hereby declare that this thesis is the result of my own research except as cited in the references.

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CARBONISATIONS OF COTTON-LIKE FIBERS FROM *CEIBA PENTANDRA L. GAERTN* TREE FOR OIL ABSORBENTS.

ABSTRACT

Offshore oil spills can cause instant and lasting damage to aquatic life and wildlife around the shores. Other than that, it can cause chemical toxicity to water security, ecological changes, food supply threats and consequently affecting tourism industry. Superhydrophobic and superoleophilic materials have been proven to be effective oil spill cleanup candidate. This work demonstrated the production of hydrophobic and superoleophilic low cost activated carbon fibers (ACF) carbonised from *Ceiba Pentandra L. Gaertn* or locally known as *kekabu*. The ACFs show significant hydrophobic-superoleophlic features with water and contact angle > 90 ° and < 5 °, respectively. The nano-pores on each fibers as viewed from scanning electron microscopy (SEM), is the key reason of superoleophilic property in ACFs. Next, we recorded a max oil sorption capacity of 96 ml oil/sorbent's weight (g). The Fourier transformation infrared spectroscopy (FTIR) and X-ray diffraction indicate the presence of functional groups, of which related to hydrophobicity-superoleophlicity. Hence, ACFs exhibit a great potential as low cost and effective oil sorbents.

KARBONISASI KAPAS DARI POKOK KEKABU UNTUK PENYERAPAN MINYAK.

ABSTRAK

Tumpahan minyak luar pesisir boleh menyebabkan kerosakan kepada hidupan akuatik dan hidupan liar di sekitar pantai. Selain itu, ia boleh menyebabkan ketoksikan bahan kimia dalam air, perubahan ekologi, ancaman bekalan makanan dan seterusnya menjejaskan industri pelancongan. Bahan yang sangat-hidrofobik dan sangat-oleofilik telah terbukti menjadi pembersihan tumpahan minyak yang berkesan. Kajian ini memperlihatkan penghasilan karbon gentian aktif hidrofobik dan sangat-oleofilik yang karbonnya diaktifkan dari *Ceiba Pentandra L. Gaertn* atau dikenali sebagai kekabu. Karbon gentian aktif menunjukkan ciri hidrofobik dan sangat-oleoflik yang signifikan dengan air dan sudut sentuh > 90 ° dan <5 °. Nano-pores pada setiap serat yang dilihat daripada mikroskop elektron pengimbasan (SEM) adalah sebab utama karbon gentian aktif sangat oleophilic. Selepas itu, kapasiti penyerapan minyak max berat 96 ml minyak / berat (g) di rekodkan. Difraksi spektroskopi inframerah (FTIR) dan difraksi sinar-X menunjukkan kehadiran kumpulan berfungsi yang bertanggungjawab terhadap hidrofobisiti dan sangat-oleofilik. Oleh itu, karbon gentian aktif mempamerkan potensi yang besar sebagai penyerap minyak paling berkesan dengan kos yang rendah.