FABRICATION OF SEMI-METALLIC BRAKE FRICTION MATERIALS USING KENAF POWDER AND ACTIVATED CARBON FROM PALM KERNEL SHELL THROUGH POWDER METALLURGY PROCESS

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"I declare that the content present in this thesis are my own work which was done at Universiti Teknologi MARA (UiTM) unless stated otherwise. The thesis has not been previously submitted for any other degree."

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ABSTRACT

Local materials are widely investigated by researchers to study their capabilities to replace commercial materials in fabrication of brake friction material. This is to reduce the materials cost and it affects to the environment. Therefore, this work is to study the capability of kenaf powder and activated carbon from palm kernel shell to replace the commercial material and to meet the requirements of international standard. In this work, eight samples containing eight different ingredients were fabricated through powder metallurgy process. One formulation is using commercial carbon while the other seven formulations are using activated carbon from palm kernel shell as its carbon content. The effect of carbon from palm kernel shell, kenaf powder, and iron oxide on friction and wear, hardness, porosity, and specific gravity were examined using international standard test procedures. Test results signify that the formulation using activated carbon from palm kernel shell can replace the available commercial carbon which produces higher coefficient of friction (COF) and hardness. All the developed samples complied with the minimum requirement on normal and hot COF of Automotive Manufacturer Equipment Company Agency (AMECA). Sample H2 composed of 10 wt. % of kenaf powder and 20 wt. % of carbon from palm kernel shell is the best formulation where it produced the highest normal and hot COF as well the Rockwell hardness. Detail analyses on the test mechanical and tribological test results show that there is no direct correlation between the mechanical with tribological properties.