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Multifunction Acoustic Board Production from Corncob-Derived Activated Carbon and Corn Husk Waste Composite as Sound and Smell Absorbers with Natural Latex Adhesive

This work aims the preparation of corncob-derived activated carbon (CCAC) by using 3M sodium chloride aqueous solution as the activated agent, and was pyrolyzed at 600, 700, and 800⁰C. Waste composites of CCAC with the activated corn husk fiber (ACH-fiber) and natural rubber latex (NR-latex) adhesive applied for multifunction acoustic board (MCB), and the acoustic board waste composite efficiency for sound and cigarette smell absorption were evaluated and compared with the commercial acoustic foam broad. Brunauer–Emmett–Teller surface area analysis results shows the optimum 2.27 nm CCAC mesopore size with surface area of 525.26 m2/g, and surface morphologies were also confirmed with scanning electron microscope. Densities of MCB samples were observed as similar to commercial acoustic foam broad. The sound absorption coefficient (SAC) of MCB samples in the frequency range of 500-6,400 Hz, increase with increasing the amount of ACH-fiber and CCAC in the range of 2.5-10%w due to the porous sound absorbing-samples have the cubic cells with connecting pore and parallel fiber bundles by the sound incident, transmitted through inside, and converted to heat, and finally absorbed by porous absorbing-materials. The sound absorbing efficient of MCB samples in this work has high as compare to the special commercial acoustic foam broad with confirming from the noise reduction coefficient (NRC). Moreover, the MCB sample in the NR-latex adhesive : ACH-fiber : CCAC w/w ratio of 95.0 : 2.5 : 2 showed 100% cigarette smell absorbing efficient for 6 mins.

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