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PANADDA PHUMEECHANYA : PRODUCTION OF ADSORBENT FROM PAPER SLUDGE TO ADSORB BTEX IN AIR. THESIS ADVISOR : ASSOC.PROF.MALIWAN BOONSANER,Ph.D.. 112 pp.

The study on the production of adsorbent from paper sludge to adsorb BTEX (Benzene Toluene Ethylbenzene and Xylene) in air was aimed to investigate the possibility of producing the adsorbent for BTEX detector tube. The experiment was conducted by baking the paper sludge in the furnace at 400 and 500 °C for 1 and 2 hours, then separated into two particle sizes: 300-500 μm and 500-1000 μm. Eight adsorbents were prepared and used in the adsorption study at 25 °C and the best adsorbent was selected according to its highest sorption capacity at equilibrium. Then, the chosen adsorbent together with the commercial adsorbent (activated carbon or AC) were used in adsorption study, and their sorption capacities were compared.

The experiment on the adsorption of Iodine with eight adsorbents showed that the sorption capacity of eight adsorbents is not different and have between 47.86 - 62.28 mg/g of the adsorbent. The experiment on the adsorption of BTEX in the air with eight adsorbents showed that the adsorbent with particles size of 300-500 μm and prepared at 500 °C for 2 hours had the highest sorption capacity. It was found that this adsorbent could adsorb Ethylbenzene > *o*-Xylene > Toluene > *m,p*-Xylene > Benzene with the capacity of 1,030.93, 826.45, 800.00, 632.91 and 222.22 μg/g of the adsorbent, respectively and the study on the adsorption isotherm of BTEX group. It was found that Langmuir isotherm can explain adsorption behavior better than Freundlich isotherm. It showed that the adsorption of BTEX group on adsorbent surface is single layer and can reversible adsorption which is physical adsorption pattern.

The adsorption efficiencies of Benzene Toluene Ethylbenzene and Xylene by the activated carbon were 59% 90% 94% and 89%, respectively while those obtained from the adsorbent prepared from paper sludge were 48% 53% 66% and 33%, respectively. This result showed that the activated carbon had higher efficiency to adsorb BTEX more than the prepared adsorbent. However, the prepared adsorbent pass only one step of carbonization process and is waste so it have low cost to produce compare with the activated carbon. Thus, this prepared adsorbent may be use as air filter in air pollution control device which need a large amount of adsorbent since it was easy to prepare from waste paper sludge and considerably cheap compared to the commercial one. Besides, the adsorption efficiency could also be increased with the increase amount of the adsorbent used.

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