

ABSTRACT

Synthesis of adsorbent has been done to replace natural zeolite through a hydrothermal sol-gel process by utilizing silica from bagasse ash from combustion extraction. The adsorbent synthesis process was done by varying the duration of calcination, Si/Al molar ratio, precipitation duration, and hydrothermal media. The results of the test using a salinity meter showed that the samples were synthesized using a furnace at a temperature of 600°C with a duration of calcination for 3 hours, then the composition of the constituent materials was 1,101 grams of bagasse ash, 0,374 grams of Al₂O₃, 2,75 grams of NaOH, 19,063 grams of distilled water, with a 60 minutes of precipitation duration has the highest adsorption power of 43,44% with a specific adsorptivity value of 1516 mg/g. In this study, changing the media for hydrothermal processing from oven to microwave did not significantly affect the specific adsorptivity of the resulting adsorbent. The XRD test results of the adsorbent showed that zeolite crystals had formed although in small quantities. It can be seen that the adsorbent formed is still dominated by amorphous structures. In addition, the results of the FT-IR test indicated that the adsorbent formed had compound bonds from zeolite and a number of impurity bonds. Based on the results of the salinity reduction test, the sample formed is an adsorbent material because it has been able to reduce the salt content.

Keywords: *hydrothermal sol-gel; silica; bagasse ash; synthesis; adsorbent.*