

## **KARAKTERISASI FILTER POLIURETAN TERIMPREGNASI KI ATAU NaOH DAN UJI EFISIENSI ADSORPSI FILTER TERHADAP GAS METIL IODIDA-131 MENGGUNAKAN SPEKTROMETER GAMMA DETEKTOR NaI(Tl)**

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### **INTISARI**

Telah dilakukan karakterisasi filter poliuretan terimpregnasi KI atau NaOH dan uji efisiensi adsorpsi filter terhadap gas metil iodida-131 menggunakan spektrometer gamma detektor NaI(Tl). Tujuan dari penelitian ini diantaranya mempelajari pengaruh diameter pori serta penambahan KI atau NaOH dan variasi konsentrasinya terhadap karakter poliuretan serta mempelajari efisiensi adsorpsi poliuretan terhadap gas metil iodida-131 pada berbagai variasi konsentrasi KI atau NaOH dan diameter pori serta pengaruh variasi kelembaban. Filter Poliuretan dengan variasi diameter pori-pori terimpregnasi kalium iodida (KI) atau natrium hidroksida (NaOH) pada variasi konsentrasi sebesar 5, 7,5 dan 10% b/b akan digunakan sebagai adsorben pada penelitian ini. Sampel diuji efektivitas daya adsorpsinya dengan dialiri gas  $\text{CH}_3\text{I}$ -131 pada variasi kelembapan  $50 \pm 2$ ,  $70 \pm 2$ , dan  $92 \pm 2\%$  serta temperatur uji  $30^\circ\text{C}$  dan laju alir sebesar 30 liter/menit. Hasil pengujian selanjutnya diuji dengan spektrometer gamma detektor NaI(Tl) hingga diperoleh data efisiensi daya adsorpsinya dari setiap sampel. Filter poliuretan kemudian dikarakterisasi terhadap gugus fungsinya dengan *Fourier-Transform Infrared Spectroscopy* (FTIR), karakterisasi morfologi dengan *Scanning Electron Microscope* (SEM), serta karakterisasi diameter pori dengan mikroskop optik.

Hasil analisis terhadap karakter poliuretan menunjukkan bahwa diameter pori mempengaruhi karakter luas permukaan adsorpsi dan sirkulasi udara pada filter poliuretan, sementara itu penambahan KI atau NaOH dan variasi konsentrasinya akan mempengaruhi karakter pori serta vibrasi gugus fungsi yang terbentuk. Hasil pengujian terhadap efisiensi adsorpsi gas metil iodida-131 menunjukkan bahwa filter poliuretan, dengan nilai efisiensi paling optimum sebesar 97,78% dengan senyawa impregnan NaOH pada konsentrasi 5% dan diameter pori sebesar 0,07 – 0,14 mm. Selain itu, kelembaban mempengaruhi kompetensi dan titik jenuh *foam* poliuretan, dengan efisiensi terbaik pada tingkat kelembaban udara  $50 \pm 2\%$ .

Kata kunci: adsorpsi, efisiensi, metil iodida-131, poliuretan, spektroskopi gamma.

***CHARACTERIZATION OF KI OR NaOH IMPREGNATED POLYURETHANE FILTER AND FILTER ADSORPTION EFFICIENCY TEST ON METHYL IODIDE-131 USING GAMMA DETECTOR NaI(Tl) SPECTROMETER***

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**ABSTRACT**

Characterization of KI or NaOH impregnated polyurethane filter and filter adsorption efficiency tests on methyl iodide-131 using gamma detector NaI(Tl) spectrometer have been carried out. The objectives of this research include studying the effect of pore size and the addition of KI or NaOH and its concentration variations on polyurethane characters as well as studying the adsorption efficiency of polyurethane on methyl iodide-131 gas at various concentrations of KI or NaOH and pore size and also the effect of humidity variations. Polyurethane filters with variations in pore size impregnated with potassium iodide (KI) or sodium hydroxide (NaOH) at various concentrations of 5, 7,5 and 10% wt will be used as adsorbents in this study. The samples were tested for their adsorption effectiveness by flowing CH<sub>3</sub>I-131 gas at humidity variations of  $50 \pm 2$ ,  $70 \pm 2$ , and  $92 \pm 2\%$  and a test temperature of 30°C and also a flow rate of 30 liters/minute. The test results were then tested with NaI(Tl) detector gamma spectrometer to obtain data on the adsorption efficiency of each sample. The polyurethane filter was then characterized by its functional groups with Fourier-Transform Infrared Spectroscopy (FTIR), morphological characterization with Scanning Electron Microscope (SEM), as well as pore diameter characterization with optical microscopy.

The results of the analysis of the polyurethane character showed that the pore size affected the character of the adsorption surface area and air circulation on the polyurethane filter, while the addition of KI or NaOH and variations in its concentration would affect the pore character and vibration of the functional groups formed. The test results on the adsorption efficiency of methyl iodide-131 gas showed that the polyurethane filter with the most optimum efficiency value was 97,78% with the NaOH impregnant compound at a concentration of 5% and a pore size of 0,07 – 0,14 mm. In addition, humidity affects the competence and saturation point of polyurethane filter with the best efficiency at a humidity level of  $50 \pm 2\%$ .

Keywords: adsorption, efficiency, methyl iodide-131, polyurethane, gamma spectroscopy.