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Karakterisasi karbon aktif sebagai penyangga katalis oksida seng untuk mendekomposisi ozon pada lingkungan industri = Characterisation of activated carbon as a support to zinc oxide catalyst for ozone decomposition in industrial environment

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Abstrak

Kebutuhan akan katalis dekomposisi ozon terus meningkat seiring penggunaan ozon yang berlebih oleh industri. Ozon tersebut dilepas ke lingkungan dalam kadar yang melebihi batas ambang yang diperbolehkan dan dapat berbahaya bagi kesehatan. Dalam penelitian ini, dibuat katalis dekomposisi ozon dengan inti aktif oksida seng berpenyangga karbon aktif. Variabel yang divariasikan adalah ukuran katalis dan persentase loading inti aktif pada penyangga katalis. Variasi ukuran katalis yang dilakukan adalah 18-35 mesh, 35-60 mesh, dan 60-100 mesh, sedangkan variasi persentase loading yang dilakukan adalah 0 -berat, 1 -berat, dan 2 -berat. Katalis dikarakterisasi dengan metode BET, metode SEM-EDX, metode XRF, metode XRD, dan metode FTIR.
Pengujian katalis dekomposisi ozon dilakukan dengan menggunakan Fixed Bed Reactor pada suhu ruang dan tekanan atmosferik. Hasil pengujian katalis dilakukan dengan metode iodometri. Didapatkan bahwa katalis dengan ukuran 60-100 mesh dan loading 2 -berat memiliki konversi dekomposisi ozon tertinggi karena memiliki luas permukaan terbesar dan inti aktif oksida seng terbanyak. Katalis menunjukkan konversi dekomposisi ozon mencapai 100 pada 30 menit pertama. Jumlah ozon yang dapat terdekomposisi mencapai 11,57-107,78 ppm sehingga katalis dapat dikembangkan sebagai filter masker pendekomposisi ozon.
<hr>Need of catalyst for ozone decomposition is continue to increase with the excessive use of ozone in many industries. Excess of ozone is released to environment in the level that exceed the allowed threshold and may be harmful to human health. In this research, catalyst for ozone decomposition was made using zinc oxide and activated carbon as the support. Varied variables were catalyst size and loading percentage of zinc oxide to the support. Variations of catalyst size were 18 35 mesh, 35 60 mesh, and 60 100 mesh, whereas variations of loading percentage were 0 weight, 1 weight, and 2 weight. Catalyst were characterized using BET method, SEM EDX method, XRF method, XRD method, and FTIR method.
Catalytic ozone decomposition was performed in Fixed Bed Reactor at room temperature and atmospheric pressure. The result of reaction was analyzed using iodometry method. It was found that catalyst which size of 60 100 mesh and loading percentage of 2 weight had the highest conversion of ozone decomposition because it had the largest surface area and the most active sites of metal oxide. This catalyst showed the conversion of ozone decomposition reached 100 for the first 30 minutes. The amount of ozone that had been decomposed reached 11.57 107.78 ppm, so the catalyst dan be developed as a mask filter for ozone decomposition.