

Pengaruh konsentrasi limbah Cr(VI) terhadap degradasi limbah fenol dan Cr(VI) dengan metode cathodic contact glow discharge electrolysis = Effect of Cr(VI) waste concentration on degradation of phenol and Cr(VI) waste by using cathodic contact glow discharge electrolysis.

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Abstrak

Limbah fenol dan logam Cr(VI) merupakan limbah organik dan logam berat berbahaya dan sulit didegradasi. Kedua jenis limbah tersebut dihasilkan dari berbagai macam proses industri seperti industri tekstil, cat, pewarna, dan lain lain. Maka, diperlukan teknologi pengolahan limbah yang efektif, salah satunya adalah dengan teknologi Contact Glow Discharge Electrolysis (CGDE). Metode Cathodic Contact Glow Discharge Electrolysis adalah bagian dari teknologi CGDE, dimana plasma terbentuk di katoda dengan pancaran sinar yang terang (glow discharge). Metode ini dapat menghasilkan spesi reaktif $\bullet\text{OH}$ dan $\text{H}\bullet$ dalam jumlah besar sehingga mampu mendegradasi limbah cair fenol dan Cr(VI) secara simultan. Kondisi optimum yang didapatkan adalah pada konsentrasi awal Cr(VI) 100 ppm, konsentrasi elektrolit Na_2SO_4 0,02 M, dan laju alir udara 0,2 L/menit. Untuk plasma anodik, didapatkan persentase degradasi untuk fenol sebesar 99,7% dan Cr(VI) sebesar 49%. Sedangkan untuk plasma katodik didapatkan persentase degradasi untuk fenol sebesar 70,98% dan Cr(VI) sebesar 44,77% selama 120 menit proses CGDE.

.....Phenol waste and Cr(VI) metal are hazardous organic waste and heavy metals that are difficult to degrade. Both types of waste are generated from various industrial processes such as textile, paint, dye, and so on. Therefore, an effective waste treatment technology is needed, one of which is Contact Glow Discharge Electrolysis technology. Cathodic Contact Glow Discharge Electrolysis is a part of plasma electrolysis technology in which plasma is formed at cathode with a bright glow (glow discharge). This method produces large quantity of reactive species $\bullet\text{OH}$ and $\text{H}\bullet$ which can degrade phenol and Cr(VI) liquid waste simultaneously. The optimum conditions obtained were at the initial concentration of Cr (VI) 100 ppm, electrolyte Na_2SO_4 0.02 M, and air flow rate of 0.2 L/minute. For anodic CGDE, the percentage for phenol degradation was valued at 99.7% and Cr(VI) degradation was valued at 49%. Whereas for the cathodic CGDE, the percentage for phenol degradation was valued at 70.98% and Cr(VI) degradation was valued at 44.77% for 120 minutes of plasma electrolysis process.