



Development of electrooxidation cells with recovered carbon, for its possible application in the removal of 17- α -ethinyl estradiol from water

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ABSTRACT

In this work, various electrochemical cells were developed from carbons recovered from mechanical seal carbons, electric motor brush carbons (MBC) and AA battery carbons (BC). After the different types of carbons were conditioned, three electrooxidation devices were assembled, where the carbons were used as anode, and the cathode was stainless steel 304 SS. In each of the devices, three different separations between the anode and the cathode were considered: 1/8", 3/16" and 1/4". The electrical characterization of each of the cells was carried out using a sodium bisulfite solution (NaHSO₃), with and without system agitation. The results indicated that agitation was not a factor that significantly affected the voltage conduction. The voltametric behavior revealed that the highest current density was presented by the MBC (39.2 mA/cm²) for a separation of 1/8", followed by the BC (17.45 mA/cm²) for the same separation. To select the best arrangement, the premature wear of the anode was also considered. In this instance the BC did not present carbon detachment, so it was selected to carry out the degradation of 17- α -ethinyl estradiol. The degradation efficiency was 74% in 2 h. The identification of by-products by gas chromatography coupled to mass spectrometry revealed the majority presence of carboxylic acids.

Keywords: Urban waste; Recovered coal; Electro-oxidation

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