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Supported Diamond-like carbon films on anodized titanium oxide as high-efficient electrocatalyst for electrochemical Ozone production

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Titania nanotubes are of interest in various fields such as electrocatalysis, sensing, and photoelectrolysis due to their high surface area ratio due to their high volume and size-dependent properties. TiO2 nanotube arrays were produced by various methods including titanium anodization in fluoride-based baths [1]. Recently, diamond-like carbon (DLC) films have attracted much attention as electrocatalysts. One of the new strategies for the synthesis of diamond-like carbon films (DLC) is liquid phase synthesis by electrochemical methods [2-3]. Ozone (O3) as one of the environmentally friendly oxidants, has found wide applications in disinfection and sterilization. Unfortunately, ozone cannot be produced during conventional water electrolysis because water is preferentially oxidized to O2 rather than O3. [4-5]. The efficiency of ozone generation through electrochemical ozone generation (EOP) is high (50%). Among all types of carbon-based materials, DLCs show the highest additional potential for OER due to tunable diamond and graphite, which is controlled by chemical deposition parameters during deposition [4-5]. A DLC film was prepared on the anodized titanium oxide surface by electrodeposition method in acetonitrile solution. The prepared electrodes were characterized by scanning electron microscopy (SEM) and X-ray diffraction (XRD), and the electrochemical performance of the electrodes was evaluated for ozone calculations by electrochemical methods.

Keywords: diamond-like carbon ,titania nanotubes ,ozone

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