

## **Ânodos de misturas de óxidos metálicos preparados por métodos não-convencionais**

### **Mixed metal oxide anodes synthesized by unconventional methods**

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The field of electrochemistry has experienced increased interest as a clean, fast and versatile technology. Mixed metal oxides (MMO) anodes are proposed in a wide range of electrochemical systems due to their electrocatalytic properties. They have been used in the alkali/chlorine industry, in oxygen and hydrogen production by water electrolysis and as energy storage. Moreover, they are promising as anode materials for electrochemical oxidation of organic pollutants [1]. However, certain limitations regarding these anodes are specially related to high synthesis time and low ability to endure intense electrocatalytic reactions in viable service lifetime. Thus, the development of alternative synthesis routes and the evaluation of its direct influence in the properties of the materials have been studied in our research group. Recently, thermal decomposition using ionic liquids (IL) as solvents for precursor solution preparation has shown to be able to produce anode materials with improved properties. Outstanding results when employing ILs are mainly attributed to the increase of the precursor solution viscosity that allows a significant reduction of deposition steps, which in turn reduces both the time and the total synthesis costs [2]. Additionally, considering that calcination steps on the anode's synthesis are normally carried out in ovens by means of conventional conduction and convection heating, further improvement of synthesis methodologies can be achieved when different heating methods are employed. More recently, special attention is given to microwave and CO<sub>2</sub> laser that are capable to promote heating through other mechanisms. Heating by microwave is still scarcely reported in the literature and presents several advantages compared to conventional heating, such as rapid and selective heating, reduction in apparatus dimensions, low electrical energy consumption, and reduction of environmental pollution [3]. As for MMO synthesis using CO<sub>2</sub> laser, advantages are centered in fast processing, elevated heating rates, easy operation, and enhanced energy efficiency compared with a conventional oven. Important findings when employing these unconventional synthesis methods will be presented considering physical and electrocatalytic properties of the films and their application towards the electrochemical oxidation of pollutants in wastewater.

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#### **References:**

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