Área: ELE

Utilization of mass spectrometry to evaluate Pt catalysts for ammonia electrooxidation in alkaline medium

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Highlights

The main product of ammonia electrooxidation is N_2;

The potential control allows producing other subproducts like NO_x;

The crystallite size affects the activity for oxidation of ammonia.

Abstract

One of the alternatives for electricity production is converting the chemical energy of ammonia molecules via a fuel cell, and the ammonia oxidation reaction (AOR), which has the advantage of not having CO_2 as a product. The AOR was studied in an alkaline medium utilizing Pt commercial catalyst dispersed on carbon via OEMS (Operando Electrochemistry Mass Spectrometry). These catalysts have different size particles, confirmed by X-ray diffraction and transmission electron microscopy analysis. The particle size follows the sequence: Pt2<Pt3<Pt4<Pt6. The main activity for AOR observed is in the Pt2 catalyst; it has 3 nm of crystallite size. In figure 1, we observed the m/z 28 mass signal (Nitrogen) for voltametric analysis; nitrogen is the major product. These results showed that we have less activity for larger particle sizes and slight changes in the curve profile of mass spectrometric results.

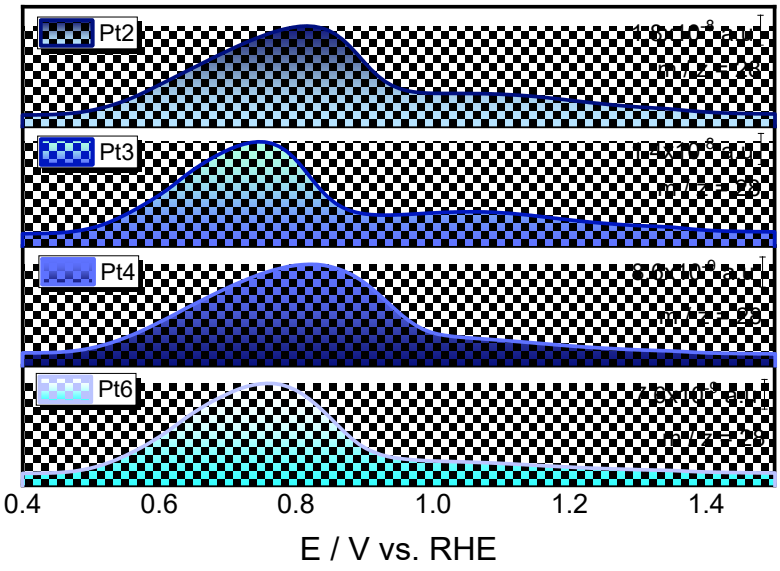

Figure 1. OEMS analysis for cyclic voltammetry, analyzing m/z 28 signal.

Acknowledgments

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