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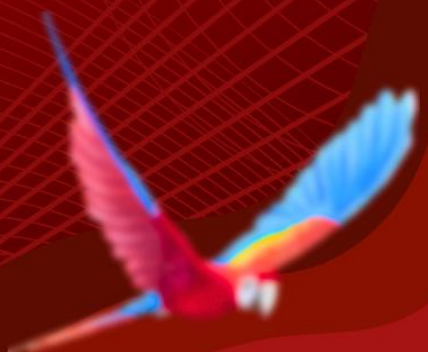

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Evaluation of PtRu/C as an electrocatalyst for the ammonia oxidation reaction

Geraldo Novaes Tessaro[1*], Joelma Perez[1]

[1] São Carlos Institute of Chemistry, IQSC-USP

**e-mail: geraldotessaro@usp.br*

In the quest for a transition to renewable and carbon-free energy sources, ammonia is emerging as a promising candidate, with applications in the safe storage and transportation of hydrogen [1]. Furthermore, the ammonia oxidation reaction (AOR) could be utilized for the removal of ammonia from wastewater and in the anode of a direct ammonia fuel cell [2]. To enhance the viability of these possibilities, further studies are required to investigate the AOR. In the present work, AOR was studied in alkaline medium with commercial PtRu as catalyst supported on carbon. In order to understand the effects of the alloy, we conducted the same experimental procedure with Pt and Ru supported on carbon. The approach of online electrochemical mass spectrometry (OLEMS) was used to identify the products of the oxidation during the sweep of potential. The PtRu catalyst exhibited a reduction of 100 mV at the onset of AOR and demonstrated mitigation in the poisoning effect when compared to Pt and Ru. The gaseous products detected during the experiments were N_2, N_2H_4, NH_2OH, HN_3, NO and N_2O. Nitrogen was identified as the major product of the AOR, a finding consistent with recent studies [3].

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