

# Comparison of Electrochemical Methods to Determine Alumina Concentration in Cryolite Based Bath

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## Abstract

Nowadays, there is a clear tendency to increase the potline current for higher productivity and to decrease cell voltage by squeezing the anode-cathode distance (ACD) for lower energy consumption and improved thermal balance in aluminum electrolysis cells. Both modifications require a better control of alumina concentration in the bath. Chemical analysis gives data with significant time delay and poor precision for the dissolved alumina content, depending on sampling method and analysis technique. Laboratory scale tests with well controlled environment can help understanding the impact of different factors on the dissolution kinetics. Even if many studies have been made in this field, only qualitative results are published in the open literature, which are mostly valid only for a small amount of bath. Theoretically, electrochemical techniques can reveal almost continuously the dynamics of alumina dissolution. However, the evolution of electrode surface, bubble formation, secondary reactions and grounding problems make it difficult to obtain results with satisfactory repeatability. This paper compares different electrochemical techniques used to monitor alumina concentration in cryolitic bath.

**Keywords:** Cryolitic bath; alumina concentration measurement; electrochemical techniques.