

# Role of Pitting in the Formation of Potholes in Carbon Cathodes - A Review

Samuel Senanu<sup>1</sup>, Tor Grande<sup>2</sup>, Arne Petter Ratvik<sup>3</sup>

1. PhD candidate

2. Professor

Department of Material Science and Engineering, Norwegian University of Science and Technology, Trondheim, Norway

3. Senior Research Scientist, SINTEF Materials and Chemistry, Trondheim, Norway

Corresponding author: samuel.senanu@ntnu.no

## Abstract

The formation of potholes on carbon cathodes is one of the main causes of pot failure in the aluminium industry. A single pothole deep enough to cause the molten metal pad to come in contact with the collector bar is enough to fail a pot. Based on current theories, the cathode wear mechanisms, industrial experiences in formation of potholes and their characteristics and the role of pitting in the formation of potholes, are discussed. Pitting, a highly localized form of cathode erosion that produces relatively small pits on the cathode surface is a phenomenon observed in potholes of the cathode block during autopsies of spent pot linings. The presence of pitting within these potholes shows that pitting plays an important role in their formation.

**Keywords:** Pitting of cathode carbon blocks; potholes in carbon blocks; cathode erosion; carbon cathode.