Influence of de-icing salt chemistry on the corrosion behavior of AA6016

De-icing salts are commonly used on European roads during winter and are usually based on chlorides of sodium, magnesium, or calcium. The salt selection depends on the local climate and legislation. Therefore, the chemical composition of the de-icing mixture can be very different within Europe. This represents an important challenge for the automotive industry as the corrosion behavior of automotive parts is intricately linked to the chemistry of the road environment. Furthermore, the use of aluminium alloys in the automotive industry increases due to a constant search for weight reduction. Till now, most of the corrosion studies on aluminium alloys in chloride based solutions have only been focused on sodium chloride. In this study, the effect of different chloride based salts on the corrosion of AA6016 was investigated. For that purpose, potentiodynamic polarization measurements were combined with surface analysis by SEM-EDS and depth profiling using GDOES. Salts based on sodium and calcium showed similar effects on the corrosion behavior of AA6016 while the magnesium based salt reduced the corrosion rate. Mixture of sodium and magnesium based salts increased the corrosive attack.

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