

## **Summary PhD of Ine Schoukens**

**Title: "Electrochemical activity of a new generation of hot dip aluminium coatings on steel"**

Galvanized steel is a common form of steel used in transport and construction, where the zinc layer acts as a sacrificial anode to protect the steel against corrosion. An alternative to this product is aluminized steel in which the aluminium layer gives improved functional properties, such as a higher thermal stability and the possibility of having a more decorative surface appearance.

For aluminium as a bulk product, it is known that a compact, inert and passivating oxide layer is formed spontaneously at the surface, giving inherent good corrosion properties to the metal. However the object of this study is a thin (20 to 30  $\mu\text{m}$ ) hot dip aluminium layer formed on top of a steel substrate. The properties and behavior of such layers have been only fragmentarily studied.

In this work, two types of hot dip aluminium coatings on steel are studied: an aluminium (iron containing) coating and aluminium-silicon coatings (with variable silicon content). The aim of this work is to understand how differences in composition and microstructure between the coatings affect their electrochemical behavior.

The electrochemical behavior was studied using macroscopic polarization experiments and local electrochemical methods ( $\mu$ -capillary cell, Kelvin Probe, AFM), and linked to the surface and in-depth microstructures, which were characterized using surface analysis techniques such as FE-SEM/EDX and GDOES.