

Master's thesis at Gränges R&I, Finspång

Chemistry: method development

Development of a method to quantify short chain carboxylic acids in aqueous solution using gas chromatographic technique.



GRÄNGES IS THE LARGEST MANUFACTURER OF ROLLED ALUMINIUM FOR ALUMINIUM HEAT EXCHANGERS. EVERY SECOND CAR PRODUCED IN THE WORLD TODAY CONTAINS MATERIAL MANUFACTURED BY GRÄNGES.

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BACKGROUND

Gränges develops aluminium alloys for different types of heat exchangers in vehicles. One application is exhaust gas recirculation heat exchangers which is used to decrease the emission of NOx gases. This type of heat exchanger requires alloys that can provide very high corrosion resistance since the exhaust gases can condense to liquid that are low in pH and may contain organic acids. The corrosion resistance of these alloys is therefore tested in laboratory-prepared-condensate solutions. It is of interest to analyze the used test solutions as well as the condensates from vehicles to understand the corrosion mechanism of the alloys and to determine to what compounds the aluminium material are exposed to in reality.

METHOD DEVELOPMENT WORK

Development of a method to quantify short chain carboxylic acids in aqueous solution using gas chromatographic technique.

Acidic solution containing different organic acids such as formic acid, acetic acid and lactic acid are used in corrosion tests of aluminium alloys to simulate the acidic condensate that the material will be exposed to in the field. The acids react with the test materials at different rates and proportion. It is important during the length of the test period, which lasts several weeks or months, to maintain the right proportions of the different acids to maintain the right test conditions. It is therefore important to have a method that can quantify the different acids. The main technique that will be used is gas chromatography using a special column. If the technique will be found inadequate, other techniques may also be investigated.

The development work includes the establishment and optimization of instrument parameters, generation of calibration curves and validation of the method.

CONTACT

If you are interested, please contact

- Heli Wiberg; heli.wiberg@granges.com, +46739833027
- Marie Ekman, marie.ekman@granges.com, +46703591221.