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GB 7998-2005

Replacing GB 7998-1987

Test method for intergranular corrosion of aluminium alloy

铝合金晶间腐蚀测定方法

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Foreword

This Standard is formulated by reference to ASTM G110-1992 "Standard Practice for Evaluating Intergranular Corrosion Resistance of Heat Treatable Aluminum Alloys by Immersion in Sodium Chloride + Hydrogen Peroxide Solution".

This Standard replaces GB/T 7998-1987.

This Standard makes a lot of editorial changes to GB/T 7998-1987.

This Standard was proposed by China Nonferrous Metals Industry Association.

This Standard shall be under the jurisdiction of the National Non-ferrous Metals Standardization Technical Committee.

This Standard is responsibly drafted by the Northeast Light Alloy Co., Ltd.

Main drafters of this Standard: Gao Zhenzhong, Hou Yi, Zheng Yunlong, Wang Meiqi, and Sun Yanchang.

This Standard shall be responsibly interpreted by the National Standardization Technical Committee of Non-ferrous Metals.

The historical version replaced by this Standard is as follows:

- GB/T 7998-1987.

Test method for intergranular corrosion of aluminium alloy

1 Scope

This Standard specifies the test method for intergranular corrosion of aluminum alloy.

This Standard applies to intergranular corrosion's inspection and measurement of intergranular corrosion of series-2XXX alloy, series-7XXX alloy, and series-5XXX alloy.

2 Method summary

This method uses metalloscope to perform the intergranular corrosion's inspection to the surface of samples or products that have not gone through corrosion, or to the samples that are after corrosion test (in sodium chloride solution, add hydrogen peroxide or hydrochloric acid; immerse the sample; conduct intergranular corrosion's accelerated corrosion test of reinforced cathode depolarization), and measure the depth of intergranular corrosion.

3 Terms and definitions

3.1

intergranular corrosion

It refers to the corrosion phenomenon that is occurred along the metal grain boundary or near the grain boundary.

3.2

cathode depolarization

Those, that can eliminate or reduce the polarization caused by the convergence of the original battery blockade, are known as depolarization. The depolarization effect that is corrosive to battery cathode polarization is called cathode depolarization. Enhancing the cathode depolarization can accelerate the corrosion rate.

4 Reagents

the removed thickness is 2 times of the product nominal aluminium-cladded layer-thickness. If there still remains aluminium-cladded layer, this sample is void, a new sampling shall be conducted.

7.2 Preparing test solution

7.2.1 For series-2XXX and series-7XXX alloy samples, pipette sodium chloride solution (4.5) into a container; according to per liter of solution containing 10 mL of hydrogen peroxide (4.1), add hydrogen peroxide; mix well.

7.2.2 For series-5XXX alloy sample, pipette sodium chloride solution (4.6) into a container; according to per liter of solution containing 10 mL of hydrochloric acid (4.2), add hydrochloric acid; mix well.

7.3 Sample corrosion

7.3.1 test shall be conducted at constant temperature of $35^{\circ}\text{C} \pm 2^{\circ}\text{C}$. Test temperature is controlled by a thermostat device.

7.3.2 The sample is hung with a plastic wire, and completely immersed in the test solution that is newly prepared (7.2). The ratio of sample's surface area to the test solution's volume is less than $20 \text{ mm}^2/\text{mL}$. Different alloy samples can not be placed in the same container; between the samples or between the sample and the container, they can not touch each other.

7.3.3 For series-2XXX alloys and series-7XXX alloys, the test time is 6h; for series-5XXX alloys, the test time is 24 h.

7.3.4 After corrosion, the sample is washed with water and dried.

8 Metallographic examination

8.1 After corrosion, the test sample is cut out (do not use shear-cut method) by 5mm at one end along vertical main deformation direction. After cutting, the cross-section is processed according to 8.2. The sample that is not gone through corrosion test shall be directly processed according to 8.2.

8.2 According to metallographic sample preparation method, grind and polish (prevent chamfer) the sample; without immersion-corrosion, observe by optical metalloscope (magnification 100X – 500X). If net-shaped grain boundary appears, then it is deemed as intergranular corrosion (typical intergranular corrosion photograph is shown in Figure 2); measure its maximum depth of intergranular corrosion.

- c) Alloy designation or chemical composition;
- d) Processing status;
- e) The sample is with or without aluminium-cladded;
- f) If test results have intergranular corrosion, indicate:
 - 1) The distribution of intergranular corrosion;
 - 2) The maximum depth of intergranular corrosion (or grade);
 - 3) When necessary, photo shall be attached for illustration.
- g) Other test results that may affect the situation or that are required to be indicated.

_____ **END** _____

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