and the greater surface characteristics of HVOF-coated components should ultimately lead to reduce the times for its maintenance.

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CORROSION RESISTANCE IMPROVE BY HARD ANODIZE A356 ALUMINIUM ALLOY BY SUBLIQUIDUS CASTING

A.Forn , M. T. Baile, S. Menargues, I. Espinosa

CDAL-Centre de Disseny d'Aliatges Lleugers i Tractaments de Superficie, UPC, Avda. Víctor Balaguer s/n, 08800 Vilanova i la Geltrú, Barcelona.
93 896 77 76
Isabel.espinosa@upc.edu

1. Introduction

When compared to conventional castings methods, Subliquidus Casting reduces porosity and trapped gas, allowing cast components to be heat treated without blistering and changing chemical reactivity of the surface [1].
The object of this study is to investigate the possibility to improve the corrosion resistance by hard anodizing in a component obtained by SLC with T6 heat treatment.

2. Materials and Methods

The microstructural characterisation of the A356 anodized aluminium alloy was carried out by scanning electron microscope image analysis equipped with EDS.

Electrochemical corrosion tests were used to study the corrosion resistance with and without the anodizing process. The Nyquist plots were obtained in a three electrode configuration. A saturated calomel electrode (SCE) was used as the reference electrode and a platinum plate was used as the counter electrode. Curves were performed after 30 min of immersion in an aerated 3.5% NaCl solution.

Impedance measurements (EIS) were used at frequency range from 55 kHz to 1.38 mHz, with a logarithmic sweeping frequency of 5 steps per decade and 10 mV excitation voltage amplitude.

3. Results and Discussion

Investigation regarding film formation mechanisms revealed that thickness of the anodic film was not uniform; however, after anodization corrosion resistant was improved.

Figure 1 shows A356 T6 microstructure. It can be appreciated δ spheroids typical of SLC, and globular eutectic as a result of T6 heat treatment

Figure 2 and 3 shows an anodized component cross-section. One can observe that the anodic film isn't completely uniform due to the silicon particles presence that disable the oxide layer formation [2].

Figure 4 Shows Nyquist plots for two specimens. Lower values of charge transference resistance (Rct) in the anodized components are associated with higher corrosion resistance [3].

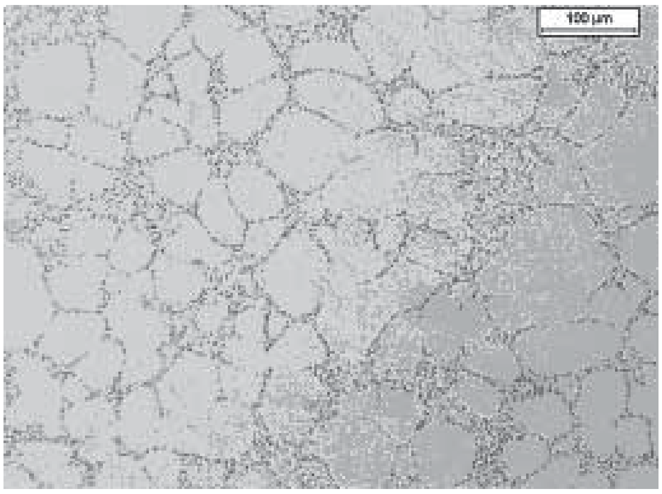

Figure 1. A356 T6 microstructure.

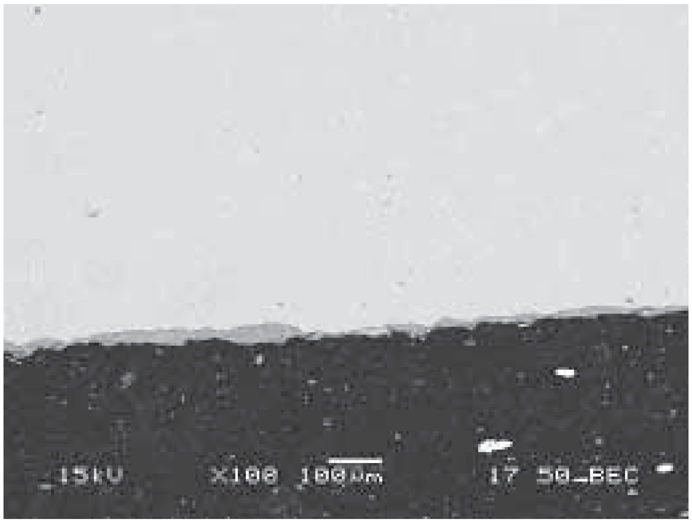

Figure 2. A356 T6 anodized

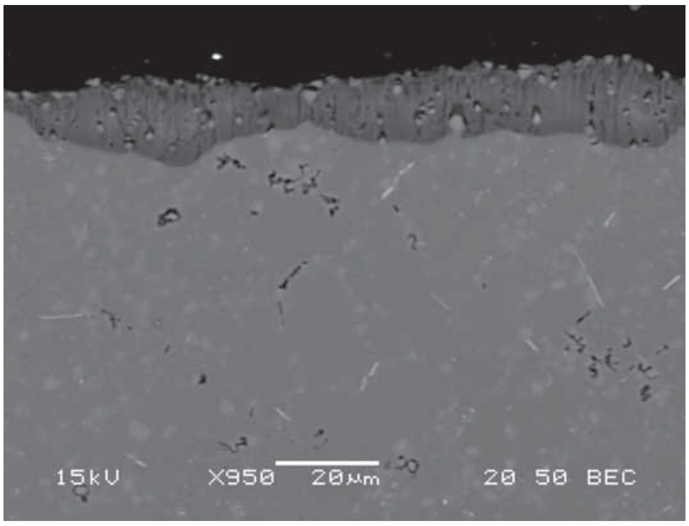

Figure 3. A356 T6 anodized.

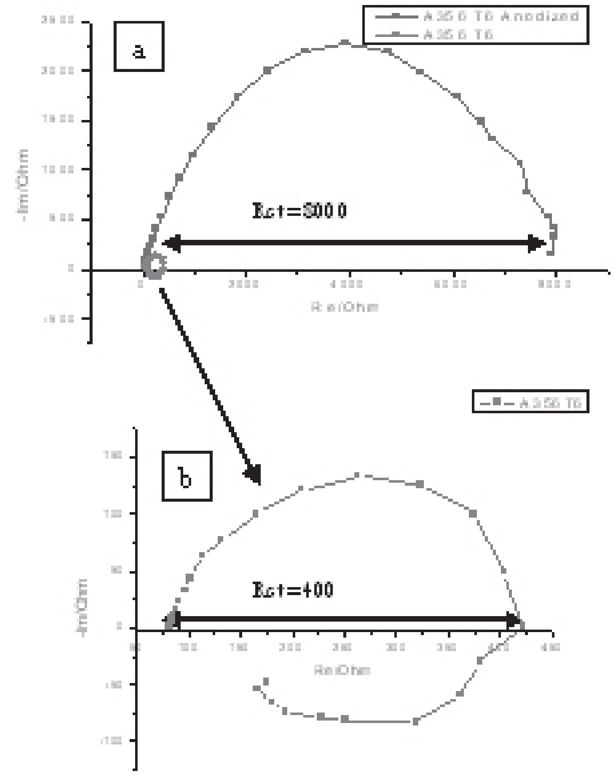

Figure 4. a) Nyquist plots for A356 T6 and A356 T6 anodized; B) Nyquist plot for A356 T6 .

4. Conclusions

• The A356 components obtained by SLC with T6 treatment can highly improve corrosion resistance by anodizing despite the non-uniform thickness.

The anodizing possibility of these components offers new perspectives to obtain components by SSM processes.

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FEATURE-BASED MATCHING OF UNDERWATER IMAGES

M. Kudzinava, R. Garcia, J. Martí

Spain, 17071, Girona, UdG, Campus Montilivi, Building P-IV

+34 972 419 812, {kudinova,rafa,joanm}@eia.udg.es

Keywords: underwater imaging, lighting artifacts, image matching.

This work investigates performance of recent feature-based matching techniques when ap¬plied to registration of underwater images. Matching methods are tested versus different contrast en¬hancing pre-processing of images. As a result of the performed experiments for various dominat¬ing in images underwater artifacts and present deformation, the outper¬forming preprocessing, detection and descrip¬tion methods are proposed.

1. Introduction

Underwater vehicles are usually equipped with video cameras to provide a visual feedback of the seafloor. In this scope matching of images acquired under water has several important applica¬tions, such as photo-mosaicing, depth estima¬tion, motion tracking, etc. Feature-based matching of two overlapping images consists in detecting salient features in each image, de¬scribing the detected features and actual matching of descriptors. Complexity of the matching task consists in overcoming the geo¬metric deformation and photometric differences between images. The water medium introduces even more difficulties for matching techniques comparing to overland. Underwater images suffer from effects such as diffusion, scatter and caustics. Moreover, there is a wider range of possible deformations due to less controllable camera movements. All these differences should be overcome by robustness and invariance of the detection and description methods applied to match the images.

In this work, several experiments have been carried out. Two descriptors, SIFT [1] and SURF [2], were tested in conjunction with five different detectors. Three classical detectors, Harris [3], Hessian [4] and Laplacian [5], were used in their straightforward form, which is not invariant to scale. The two other detectors, DoG and FastHessian, are the original detectors of SIFT and SURF, respectively. As opposed to the previous three detectors, they perform multi-scale detection. Several matching methods, represented by possible combinations of detec¬tor and descriptor, were tested on 80 image pairs from four underwater sequences. In all cases RANSAC [6] was used to estimate homo¬graphies. Initial matches following the esti¬mated homography were accepted as correct correspondences, or inliers, while the rest of the matches were rejected as outliers.