

Cirrus Lustre™

Revolutionizing Aluminium Finishes: A Breakthrough in White Anodising

Introduction

Cirrus Materials Science has developed a breakthrough in a surface engineering technique produces pure white anodised surfaces on aluminium alloys. In the evolving world of materials science and new surface engineering techniques that are constantly extending the boundaries of what is possible. This unprecedented development marks an industry first and challenges long-held industry beliefs about creating reliable white anodising on aluminium.

Background and Challenge

Colouring anodised aluminium surfaces traditionally relies on a second operation which incorporates organic or inorganic colourants into the porous oxide layer through absorption or EPD. Such processes, when used to create white anodised surfaces, require incorporation of copious quantities of titanium oxides, in a process that typically fails to produce repeatable pure white surfaces. Hence, the industry scepticism on the ability for industrial processes that reliably produce pure white anodised surfaces.

The Innovation

To achieve a consistent white anodising, the experts at Cirrus Materials Science developed a completely new anodising process. Our pioneering approach was to develop an oxide layer with an exceptionally high L^* value above 90 using eco-safe chemistry in a single bath. Producing this required a method not only transcends the conventional dependence on dyes but also ensures superior stability and uniformity in colour. Collectively, Cirrus' breakthrough in white anodising development not only elevates surface aesthetic but also provides products with a rugged durable finish.

Why is it white?

The unique Cirrus Lustre™ process develops a graded density aluminium nanotube structure, as shown in the cross-section SEM image in figure (a), providing a plethora of light scattering intersections and naturally producing a white surface. The structure not only supports production of a range of white tones by manipulation of the alumina nano structure but also allows impregnation of seals and other materials to create unique functional attributes.

Complementary seal

Maintaining white while sealing the anodised surface presents distinct challenges, requiring a protective seal with unique attributes. Cirrus's innovative low-temperature sol-gel seal not only achieves this but also increases the surface's L^* value and develops a durable chemically resistant superhydrophobic surface as shown in figure (b). This advanced process avoids materials which can degrade the surface appearance.

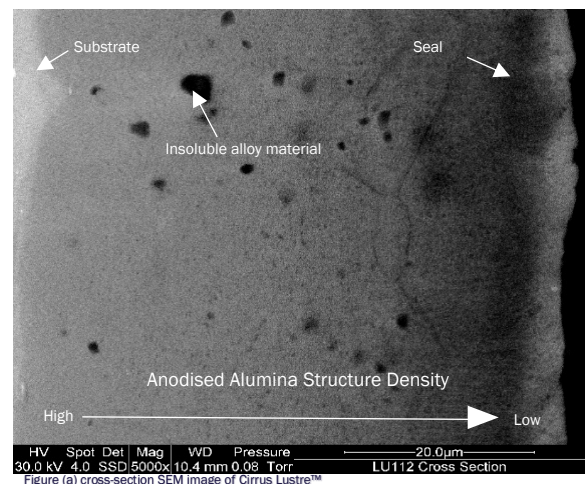


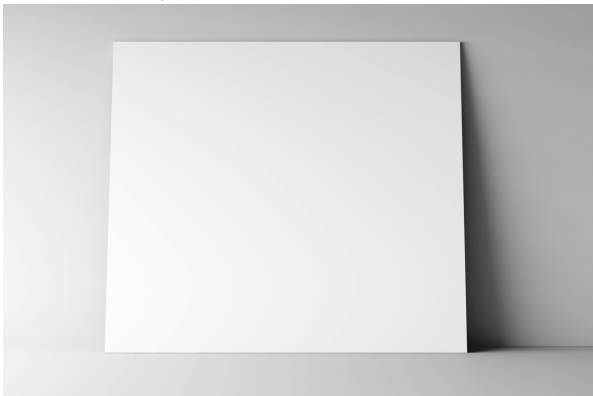
Figure (b) super hydrophobicity on Cirrus Lustre™ Surface

Applications

Aerospace

In the aerospace industry, the white anodised aluminium innovation can offer a range of aesthetics and functionality. The robustness of the white anodised aluminium ensures a consistent and visually appealing design throughout the aircraft, enhancing the overall passenger experience with its sleek and clean appearance.

White anodising has been proven effective across a broad spectrum of commercial alloys, including the versatile 5k, 6k, and 7k series. The range of available alloys allows designers to select for material properties knowing that the enhanced aesthetic and functional benefits of white anodised finish is widely available.



Consumer Electronics

In the consumer electronics space, white anodised aluminium offers a highly sought after blend of elegance and functionality for adoption in the design of laptops, smartphones, and tablets. The pure white finish not only provides a sleek, modern look but also enhances device durability. Moreover, for components like enclosures, the white anodised surface could improve heat performance, aiding in device thermal management. This innovative surface contributes to the aesthetic differentiation of products in a highly competitive market, allowing brands to provide a distinct visual identity. Additionally, the white anodised aluminium is less prone to showing fingerprints and smudges, maintaining a pristine appearance over time.

Conclusion

Cirrus Lustre™ technology is a pivotal addition to the Cirrus suite of surface technologies, providing leaders in Aerospace and Consumer Electronics an opportunity to deliver a breakthrough performance from a world leading innovation that is better than traditional limitations known in anodising and introduce a new era in coating performance. The technology is a testament to what can be achieved by challenging the norm and developing the latest advancements in surface finishing and anodising.

In conclusion, the development of a white anodised surface for aluminium alloys, Cirrus Lustre™ stands as a significant achievement in surface engineering.

About the authors:

We invite further inquiry, research collaborations, and discussions on this groundbreaking technology from the industry. For more information or to express interest, please contact or visit Cirrus Materials Science.



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Chairman of the Board at Cirrus, renowned IP strategist, consistently placing technology development at the forefront of leading a visionary approach in developing innovative surface coating technologies.



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Over a decade of experience, and expertise in manufacturing, applying, and designing advanced coatings, bridging the gap between innovation and practical application in the industry.