

Metallic Color Coating with Silica Layer Embedding Metal Nanoparticles on Textured Metal Surface

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Abstract

The global household appliances market is rapidly growing and chasing high-quality of end products. For high-quality of household appliances, customers demand a beautiful exterior finishing like metallic color coating as well as high fictional performances of them. There are many different methods to metallic color coating on the surface of exterior such as vacuum vapor deposition, sputtering, anodizing and wet coating [1]. However, vacuum coating processes are not useful on large-scaled surface and have higher cost than wet coating processes. And wet coating with organic pigment has been limited to the clarity of color and occurred color degradation to the external environment. So we need to make a clear metallic color has long-term durability with inorganic color coating by using wet process.

In this study, we deigned the textured metal substrate showed color by a diffraction grating and coated silica layer embedding noble metal nanoparticles. Then, we could see a combined color with the plasmonic color of silica layer and diffraction grating color of textured metal. In addition, we adopted the simulation structure that has a silica layer containing Ag nanoparticles which are deposited on the textured metal substrate by Finite-Difference Time-Domain (FDTD) method.

Keywords: *Metallic color, Silica layer, Nanoparticles, Textured Metal*

References

- [1] Tan, Shawn J., et al. Plasmonic color palettes for photorealistic printing with aluminum nanostructures. Nano letters 14.7 (2014): 4023-4029.

Biography

Hohyeong Kim joined Research Institute of Advanced Manufacturing Technology, Surface R&D Group, Korea Institute of Industrial Technology (KITECH), in 2009 as a researcher. He received his B.S. and M.S. degrees from the Inha University, Republic of Korea in 2007 and 2009. He has been working on metal oxide gas sensors and on the synthesis of metal nanoparticles.