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**Composite Plasma Electrolytic Oxidation to Improve the Thermal Radiation Performance and Corrosion Resistance on an Al substrate**

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**Highlights**

- ▶ Composite plasma electrolytic oxidation was performed using dispersed CuO particles in convectional PEO electrolyte.
- ▶ Thermal radiation performance and corrosion resistance were examined by FT-IR spectroscopy and electrochemical methods, respectively.
- ▶ Implemented the surface close to the black body, such as color and chemical composition.
- ▶ Corrosion resistance was enhanced significantly compared with the substrate by potentiodynamic and EIS test.

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