

# 自己修復・防曇性能を有したグラフェン含有双性 濡れ性表面の構築

## Construction of Graphene-Containing Zwitter Wettable Surfaces with Self-Healing and Antifogging Performance

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### Abstract

Zwitter wettable surfaces have been shown to provide excellent anti-fog/anti-frost performance, even though the surface remains hydrophobic and allows moisture to be incorporated into the film. Although polymer anti-fog coatings offer high performance, they are soft and therefore vulnerable to scratches and cuts. Self-healing materials achieve longer life and simplified maintenance by restoring structure and function. However, self-healing materials that utilize surface hydrophilicity are viewed as conflicting with zwitter wettability properties. Therefore, further investigation is needed to fabricate antifogging coatings that combine zwitter wettability and self-healing properties. Here, we show that polymer multilayer coatings composited with graphene exhibit antifogging and self-healing properties simultaneously. The fabricated layer-by-layer coatings exhibited zwitter wettability and self-healing performance comparable to previous studies. In antifogging tests, the coatings withstood harsh cooling environments and exhibited high antifogging performance. This study provides a new zwitter wetting strategy that combines self-healing and antifogging properties and will be an exceptional option for future surface coatings.

キーワード：双性濡れ性、自己修復、防曇、交互積層法

**Keywords** : zwitter-wettability, self-healing, anti-fog, layer-by-layer

### 1. はじめに

気象現象の変化に由来する雨、雪、霧、霜は、我々の生活に大きな影響を与える。その中でも、相対湿度の上昇や温度差によって表面に発生す

る霧は、多数の微小水滴の核生成によって可視光の著しい散乱を引き起こし、光の透過率を低下させる厄介な現象を引き起こす。曇りによる透明性や視認性への悪影響は、窓ガラス、太陽電池、航空機、自動車、眼鏡、医療・分析機器

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2023年12月22日受付

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