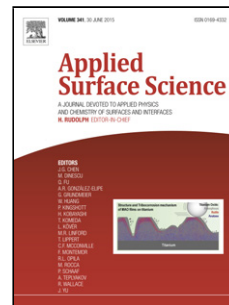


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## Durable Superamphiphobic Nano-silica/Epoxy Composite Coating via Coaxial Electro spraying Method

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### Highlights:

1. Fluorinated nano-silica with uniform diameter was prepared by in-situ sol-gel perfluoropolysilane modification.
2. Superamphiphobic nano-silica and epoxy composite coating with controllable nanoparticle loading was fabricated by coaxial electro spraying method.
3. Fluorinated nano-silica was distributed evenly on the micro epoxy particles, showing a special micro-nano hierarchical structure.
4. The prepared superamphiphobic surface exhibited improved mechanical property and good durability.

**Abstract** In this study, a durable superamphiphobic nano-silica and epoxy composite coating with good environment resistant was successfully fabricated. Fluorinated nano-silica with low surface energy was prepared by in situ sol-gel method, which can be stably dispersed in the solution. Applying fluorinated nano-silica dispersion as sheath and epoxy solution as core, fluorinated nano-silica/epoxy superamphiphobic composite coating was prepared by a coaxial electro spraying method. Fluorinated nano-silica with uniform nano-size was distributed evenly on the micro epoxy particles, showing a special micro-nano hierarchical structure. Nano-indentation shows evident improvement in modulus and hardness of fluorinated nano-silica/epoxy composite coating than that of raw epoxy. In addition, durability of the superamphiphobic coating was assessed by performing harsh chemical environments immersion and scotch tape test.

**Keywords:** superamphiphobic; fluorinated nano-silica; epoxy; composite coating; coaxial electro spraying

### 1. Introduction

Superhydrophobic and superamphiphobic surfaces have attracted extensive

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