

# Recent progress in the preparation, properties and applications of superhydrophobic nano-based coatings and surfaces: a review

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## ABSTRACT

With the recent progress in nanotechnology and material engineering, nano-based coatings have become multifunctional, smarter, efficient, versatile and durable. Superhydrophobic coatings are an important class of the smart coating family, which has gained recognition in coating science over the last few years. The uniqueness of superhydrophobic coatings arises from the various phenomenal innovations, and its development is expected to continue in the next decades. The bioinspired superhydrophobic surfaces are commonly

obtained by designing a double-scale structure by using nanotechnology, followed by the addition of water repellent compounds. It lacks an overview article describing on the recent progress in superhydrophobic coatings and surfaces. In this perspective article, various fundamental aspects of wettability and related phenomena are discussed. We present and compare the existing methods for the preparation of superhydrophobic coatings. Properties of superhydrophobic coatings such as self-cleaning, anti-icing, anti-fouling, and anti-bacterial features were also introduced. The review also discusses various superhydrophobic technological breakthroughs and future trends in the preparation and application of these materials.

### **KEYWORDS**

Superhydrophobic coating; Interfaces; Nanoparticles; Water repellent; Perfluorinated compounds; Silane