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## Mechanical Durability of Liquid Repellent Coatings

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**ABSTRACT:** Liquid repellent surfaces with mechanical durability are critical for many commercial applications that involve liquid contact, human handling, or environmental exposure. In this study, the response of a range of coating types to different mechanical impact tests on flat and structured surfaces was investigated. The surface tension and chemistry of the coating material, the mechanical properties of the substrate and coating thickness were varied to determine their respective effects on durability of the coated surface. The mechanical durability tests included tape peeling, bending, rotary abrasion, and dynamic impact. The surface durability was evaluated by changes in wetting performance (contact angle measurements), surface morphology (SEM) and surface chemistry (FTIR, XPS). The insight gained facilitates selection of substrate preparation, coating material and coating method for specific applications depending on mechanical durability requirements. General comments and recommendations on the appropriateness of standard methods to evaluate mechanical durability are also provided to guide future studies.

**Key words:** Mechanical durability, Surface wetting, Coating adhesion, Wear, Bending

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### 1. Introduction

Surface modification to achieve specific wetting properties on various substrates has been studied intensively since the discovery of the “lotus effect” [1]. Enormous effort has been

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