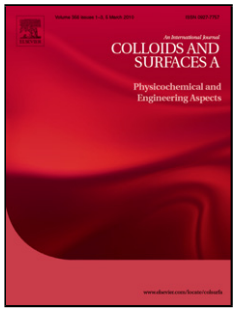
Accepted Manuscript



Title: Fabrication of Bioinspired Superliquiphobic Synthetic Leather with Self-Cleaning and Low Adhesion

Authors: Dev Gurera, Bharat Bhushan

PII: S0927-7757(18)30141-9
DOI: https://doi.org/10.1016/j.colsurfa.2018.02.052
Reference: COLSUA 22304

To appear in: *Colloids and Surfaces A: Physicochem. Eng. Aspects*

Received date: 18-12-2017
Revised date: 4-2-2018
Accepted date: 20-2-2018

Please cite this article as: Gurera D, Bhushan B, Fabrication of Bioinspired Superliquiphobic Synthetic Leather with Self-Cleaning and Low Adhesion, *Colloids and Surfaces A: Physicochemical and Engineering Aspects* (2010), https://doi.org/10.1016/j.colsurfa.2018.02.052

February 4, 2018

Fabrication of Bioinspired Superliquiphobic Synthetic Leather with Self-Cleaning and Low Adhesion

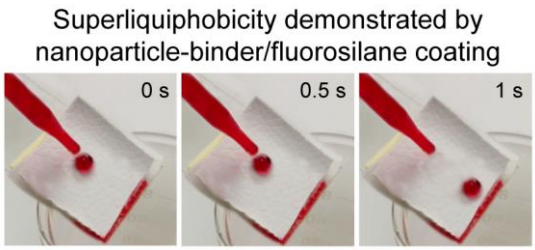
Dev Gurera and Bharat Bhushan *

Nanoprobe Laboratory for Bio- & Nanotechnology and Biomimetics (NLBB),

The Ohio State University, 201 W. 19th Avenue, Columbus, OH 43210-1142, USA

*Corresponding author: bhushan.2@osu.edu

Graphical abstract



Abstract

The leather is a flexible, yet strong material, which is used in many applications. These include footwear, furniture, automotive industry, clothing, gloves, sports gear, and bags. In order to reduce cost and to tailor flexibility, the demand for synthetic leather has grown. Synthetic leather consists of about 55% polymer, about 40% plasticizer, about 1% stabilizer, and the balance filler. For many applications, the leather should have liquid repellency and self-cleaning, and maintain these properties at high temperature. In this study for the first time, synthetic leather has been reported to achieve superliquiphobicity and self-cleaning by using multi-layered nanocomposite coating structure. The coated surface exhibited high mechanical durability and maintained these properties up to 70°C.

Keywords: Synthetic leather, lotus effect, nanocomposite coating, self-cleaning, low adhesion

1. Introduction

Leather has been an important material since the beginning of the human race [1–4]. Before the development of woven textiles, leather was the only available material to use for clothing. Due to its desirable traits, including high tensile strength, flexibility, resistance to tearing, puncturing, and