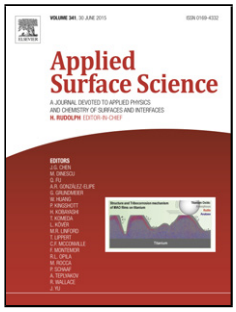

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Superhydrophobic Coatings on Wood Substrate for Self-Cleaning and EMI Shielding

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Highlights:

- A simple, safe and highly effective way to achieve superhydrophobic wood surface was realized.
- Excellent superhydrophobicity with water CA of 160° and RA of 4.6° were obtained.
- The obtained samples show excellent electromagnetic shielding and self-leaning performance.

Abstract:

A layer of superhydrophobic coating having good electromagnetic shielding and self-leaning performance was fabricated on a wood surface through an electroless copper plated process. The superhydrophobic property of the wood surface was measured by contact angle (CA) and roll-off angle (RA) measurements. The microstructure and chemical composition of the superhydrophobic coating were analyzed by scanning electron microscopy (SEM), energy dispersive spectrometer (EDS) and X-ray diffraction (XRD). The analysis revealed that the microscale particles were uniformly distributed on the wood surface and the main component of the coating is metallic copper. The as-prepared Cu coatings on wood substrate exhibit a good superhydrophobicity with water contact angle about 160° and rolling angle less than 5°.

Keywords: superhydrophobic coating; wood; electromagnetic shielding; self-leaning.

1 Introduction

With the rapid development of science and technology, electromagnetic pollution attracts more attention than before, especially in precision instruments, aerospace systems, scientific measurement systems, medical equipment and so on[1-3].As electromagnetic shielding materials, metal materials have strong advantages, but they are limited by resources, cost, quality and other aspects[4-9]. However, wood based electromagnetic shielding composites not only can overcome these shortcomings, but also have good conductive properties and electromagnetic shielding effectiveness, and play a more and more important role in the field of electrostatic protection and electromagnetic shielding[10.11]. In addition, we all know that wood products are easy to absorb water and steam when they are exposed to environmental conditions for a long time, which strongly affects the durability of wood products and causes damage to their properties. In order to prevent the coating from being polluted and corroded under the outdoor conditions, improving the chemical inertness and water resistance of the surface of the material will contribute to expanding the application field of the wooden electromagnetic shielding material.

Superhydrophobic surfaces, with water contact angle (CA) greater than 150° and roll-off angle (RA) less than 10°, have