Spray Retention Using Pre-mixed Polyelectrolyte Solutions
Technology #17877

Applications

Efficient deposition of spray would be beneficial for a wide range of applications, including agriculture, paints, coatings, cosmetics and medical applications.

Problem Addressed

There are two challenges associated with sprays. The first is eliminating the sources of deposition inefficiencies in sprays by using the maximum amount of the sprayed liquid. The second is to have maximum coverage of the target. Conventional methods try to overcome these challenges by changing the composition of the spray to reduce bouncing and drift when the liquid is sprayed. However, this technology overcomes these challenges through in-situ deposition of sparse hydrophilic defects, formed by the precipitation of oppositely charged polyelectrolytes, which modifies the wetting properties of the target surface.

Technology

This technology consists of spraying two polyelectrolytes, one positive and one negative, onto the target surface to create hydrophilic defects, which will allow the target surface to retain more of the liquid of interest. The polyelectrolytes can either be sprayed prior to the liquid of interest or in conjunction. To test this approach, both pure water and positive (LPEI) with negative (PAA) polyelectrolyte aqueous solutions were sprayed on a super-hydrophobic OTS-coated silicon nanograss surface. For pure water, coverage did not exceed 7% after six 500µL steps, but coverage reached 80% when 3mL of the polyelectrolyte solution were used.

Advantages

- Increased spray retention on hydrophobic surfaces
- Reduces amount of spray necessary

Categories For This Invention:

Materials
Hydrophobic/Hydrophilic
Life Sciences
Agriculture
Crop Improvement
Insect Management
**Intellectual Property:**

Systems and methods for surface retention of fluids  
US Patent Pending  
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Systems and methods for surface retention of fluids  
PCT  
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**Publications:**

Enhancing Droplet Deposition Through In-situ Precipitation  
Nature Communications  
August 30, 2016

**External Links:**

Varanasi Research Group  
http://varanasi.mit.edu/

**Image Gallery:**