

Hydrophobic-to-Hydrophilic Transition of Polyethylene Surfaces via Salicylic Acid Grafting

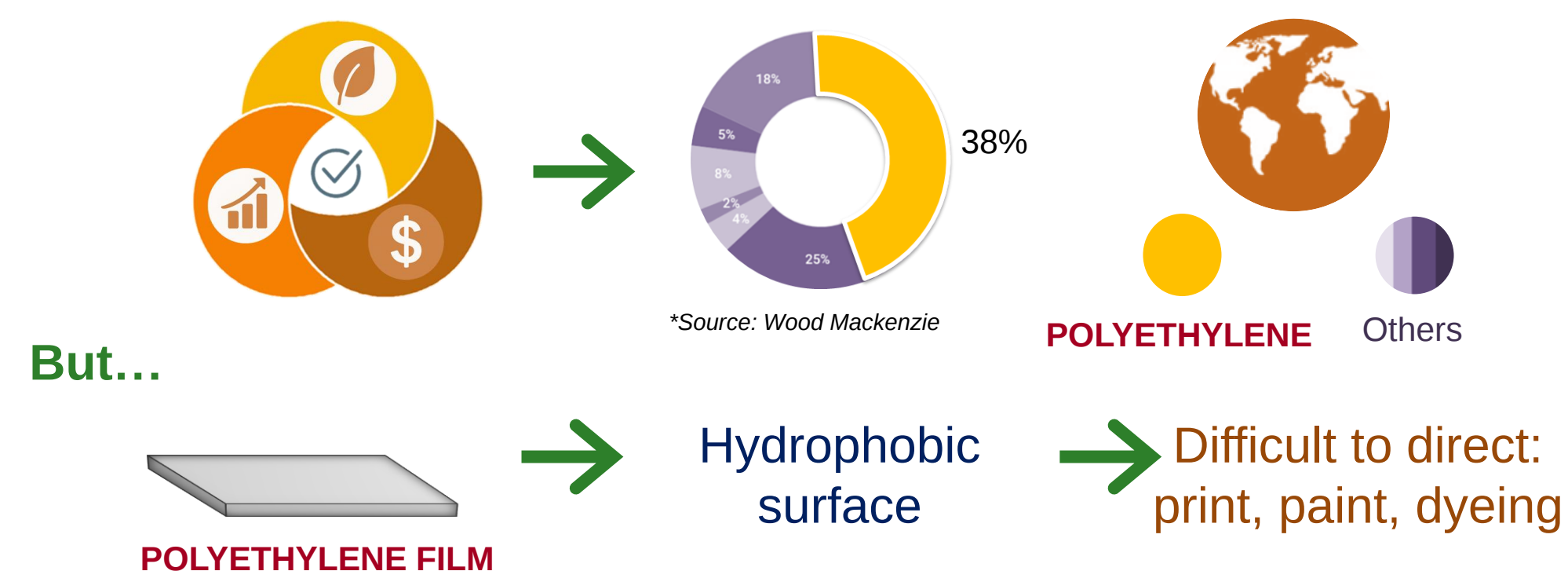
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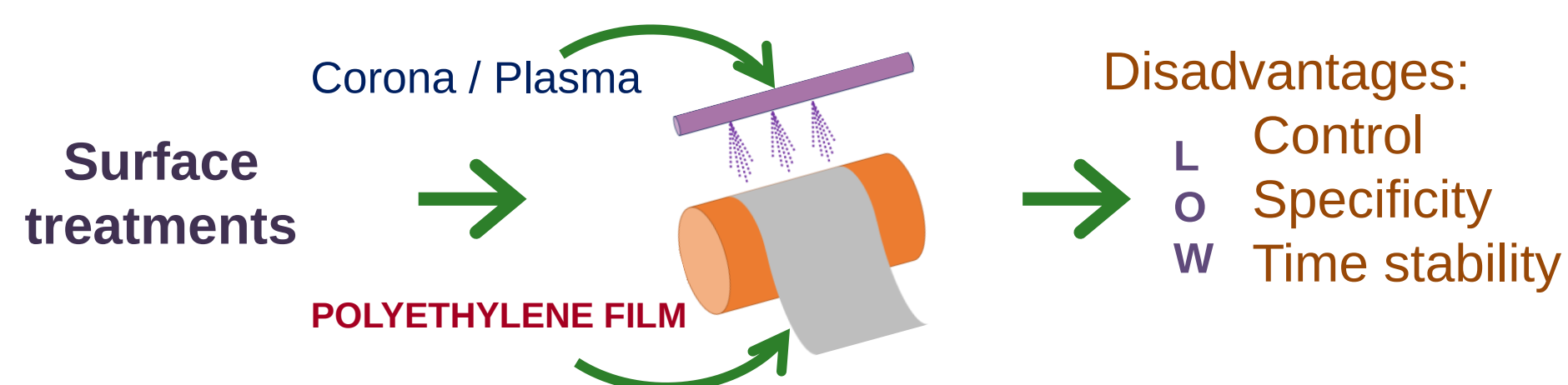
INTRODUCTION & AIM

POLYETHYLENE

Global plastic resin demand 2021*



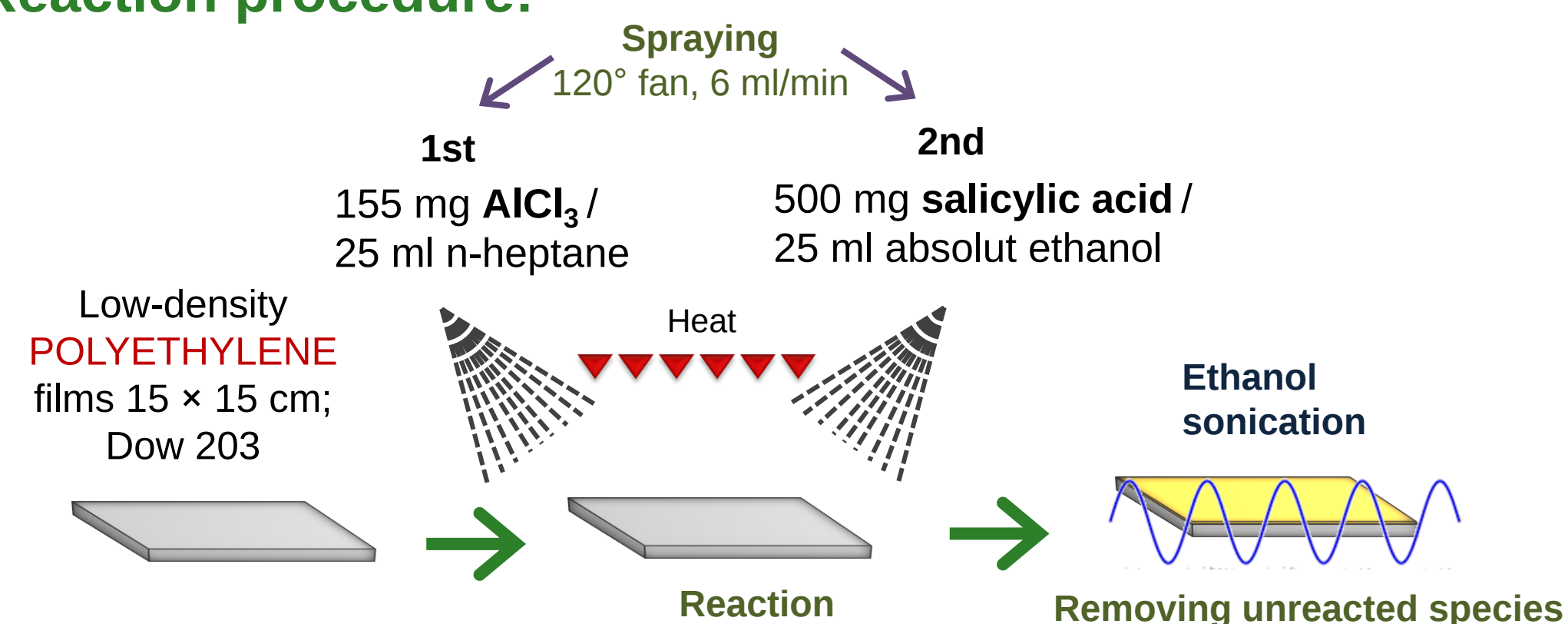
Conventional solutions:



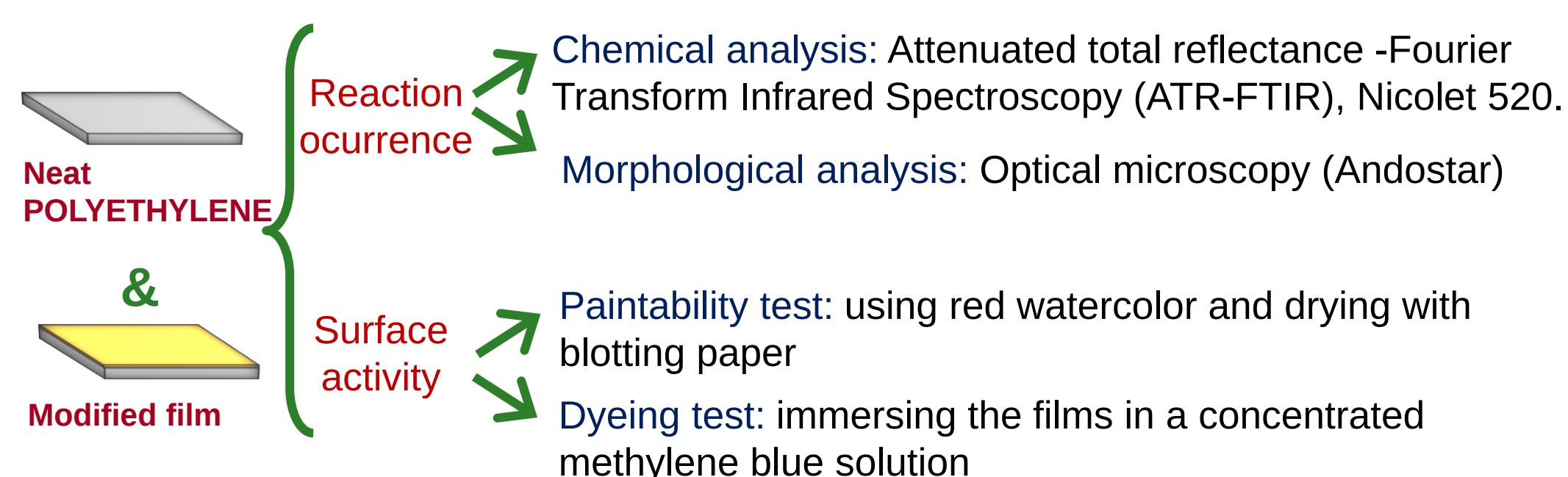
This work aims to functionalize polyethylene films through aluminum-mediated grafting of salicylic acid to enhance surface wettability and paint adhesion

METHOD

Reaction procedure:



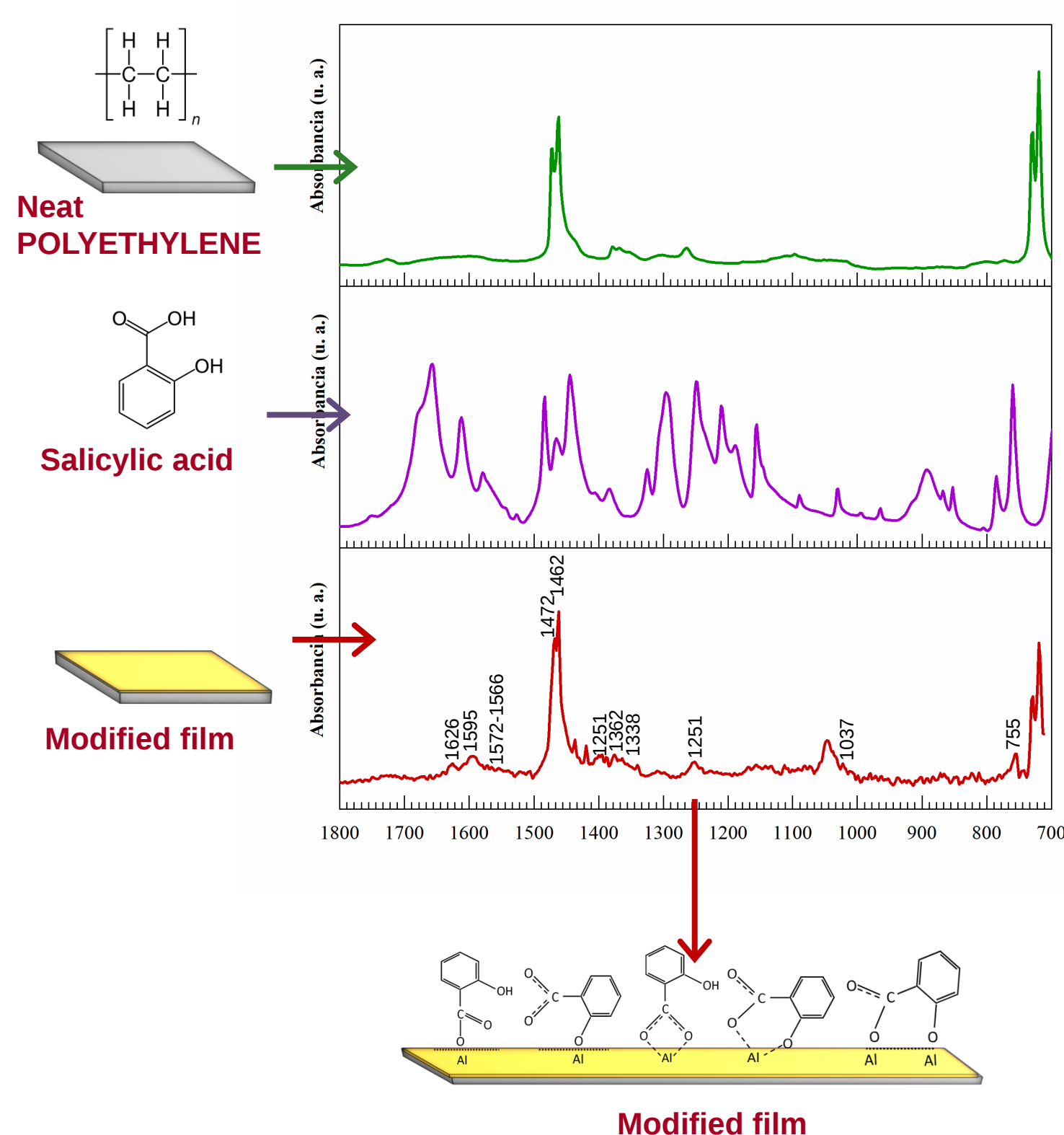
Characterization:



RESULTS & DISCUSSION

Chemical analysis

FTIR-ATR spectra

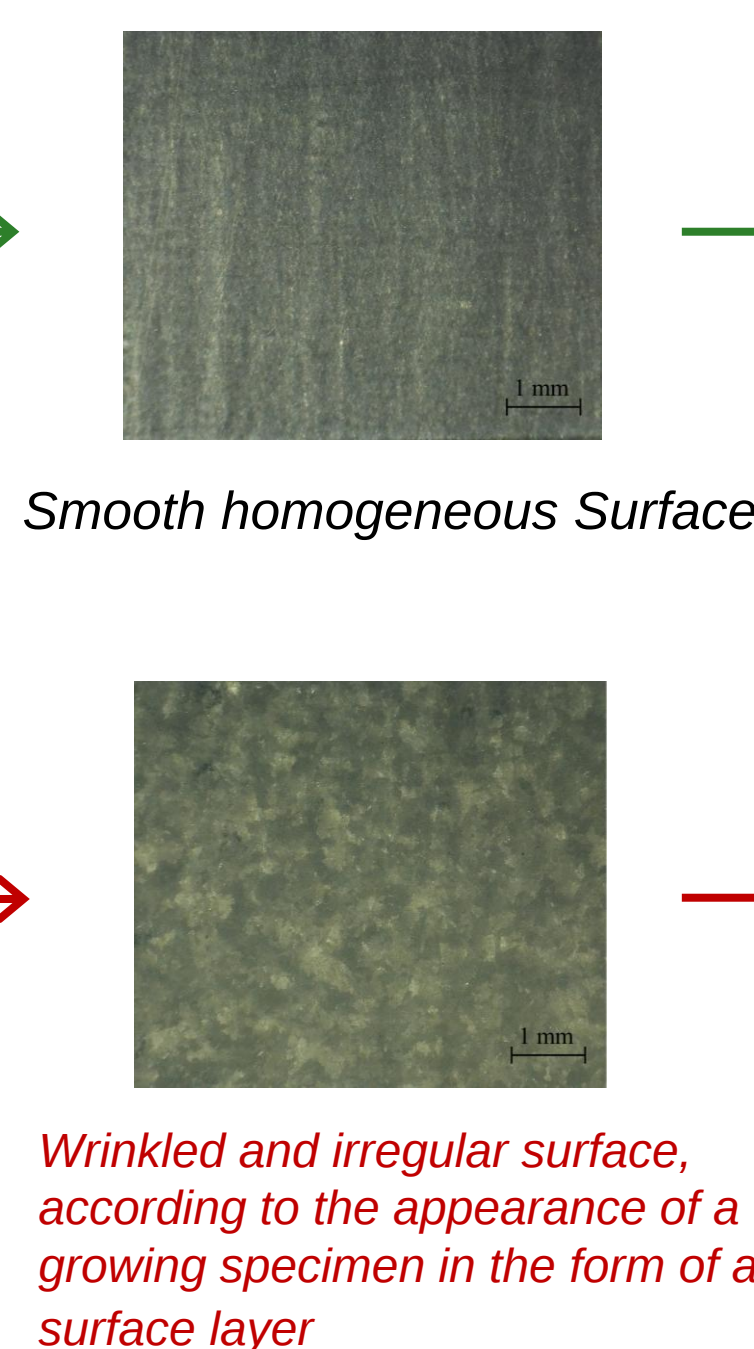


Aluminum salicylate complexes: monodentate and bidentate, chelates or bridge

Reaction occurrence was verified as salicylates complexes were chemical anchored to polyethylene surface with a good reaction extent covering the complete treated film surface.

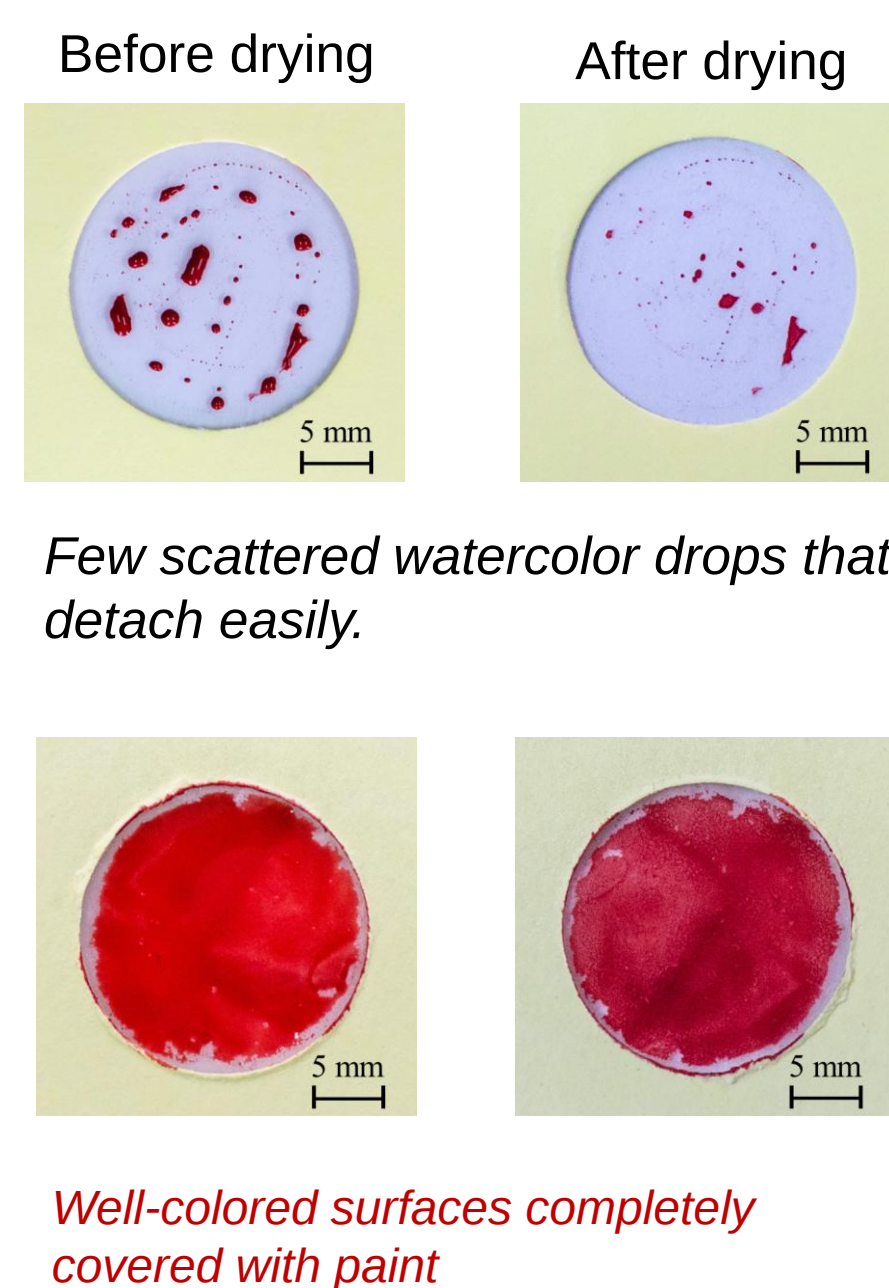
Morphological analysis

Optical microscopy



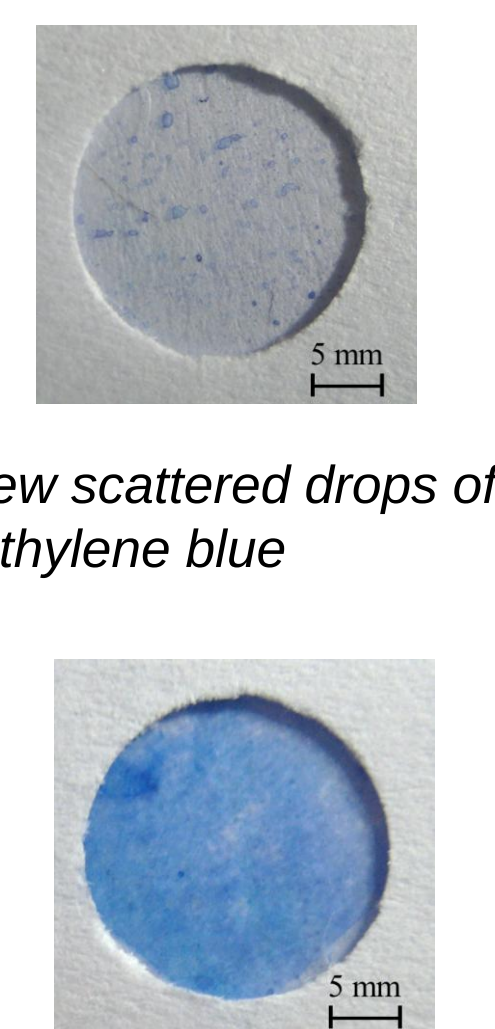
Paintability test

Red watercolor surface painted



Dyeing test

Methylene blue



Wettability and adhesion of water-based paints were significantly improved

CONCLUSION

Reaction occurrence, wettability and adhesion of water based paints were verified in all treated surfaces. These results indicate that the proposed strategy effectively transforms the polyethylene surface from hydrophobic to hydrophilic, enabling the use of eco-friendly paints.