Comments on Polymer Characterization and Superhydrophobic Surfaces



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Polymers are fantastic materials and their uses in a wide variety of applications are well known and documented. In the first part of the talk, I will discuss some of the considerations that need to be made when these materials are characterized. A basic understanding of the mechanical, thermal, and molecular mass of polymers can be a pathway for understanding traditional applications and new potential applications of polymers.

In the second part of the talk, I will focus on some research in our group on superhydrophobic surfaces that have applications in nonwetting, antimicrobial and antifouling coatings. We have helped in the development and understanding of the behavior of these systems. Our system involves changing the hydrophilic nature of diatomaceous earth (DE) to superhydrophobic materials with the use silane coupling agents.

Finally, given time, I will discuss graduate study in the USA for students possibly interested in further studies.



Selected References:

- B. R. Sedai, B. K. Khatiwada, H. Mortazavian, and F. D. Blum, Development of superhydrophobicity in fluorosilane-treated diatomaceous earth polymer coatings, *Applied Surface Science*, **2016**, 386, 178-186. *doi:* 10.1016/j.apsusc.2016.06.009
- H. J. Perera, B. K. Khatiwada, A. Paul, H. Mortazavian F. D. Blum, Superhydrophobic surfaces with silane-treated diatomaceous earth/resin systems, *Journal of Applied Polymer Science*, 2016, 133, 44072. (A graphic about this paper was used as the cover for the Nov. 5, 2016, 2014 issue.) *doi:10.1002/APP.44072*
- B. R. Sedai, S. H. Alavib, S. P. Harimkar, M. McCollum, J F. Donoghue, F D. Blum, Particle morphology dependent superhydrophobicity in treated diatomaceous earth/polystyrene coatings, *Applied Surface Science*, **2017**, 416, 947–956.
- H. J. Perera, F. D. Blum, Alkyl Chain Modified Diatomaceous Earth Superhydrophobic Coatings, 2018 Advances in Science and Engineering Technology International Conferences (ASET), 2018, 1–4.
- H. J. Perera, R. Latifi, F. D. Blum Development of Structure in Hexadecyltrimethoxysilane Adsorbed on Silica, *Journal of Physical Chemistry, C.* 2019, 123, 19005–19012.H. J Perera, F. D. Blum, Competitive Adsorption on Diatomaceous Earth Particles, 2019 Advances in Science and Engineering Technology International Conferences (ASET), Accession number 18690661 Electronic ISBN: 978-1-5386-8271-5.
- A. L. D. V. T. Ambegoda, S. M. Egodage, F. D. Blum, and Madhubhashini Maddumaarachchi, Enhancement of hydrophobicity of natural rubber latex films using diatomaceous earth *Journal of Applied Polymer Science*, **2021**;138:e50047 (p1-7).

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