

# The Influence of Hydrophobic Dyes on the Two-Dimensional Structures of Diblock Copolymers

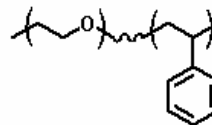
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**Background.** Diblock copolymers are known to self-assemble into various structures at the air-water interface. Specifically, polystyrene-polyethylene oxide (PS-PEO) can form large continents, spaghetti, or dots depending on the %PEO of the polymer. We aim to better control the structures that form by blending PS-PEO with other substances.

**Approach.** The polymer blends were characterized on a Langmuir-Blodgett trough in two fashions. Linear compression on the trough created isotherms for each blend. Dips with silicon oxide transferred the structures at the air-water interface onto the wafer, which was then imaged through Atomic Force Microscopy (AFM) to determine the structures that formed.

## Poly(ethylene oxide)-b-polystyrene (PEO-PS)

PEO Monomer: 44 g/mol



PS monomer: 104 g/mol



Continents

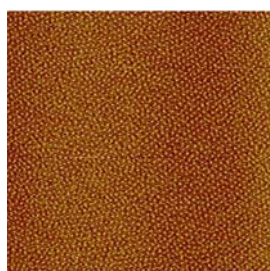
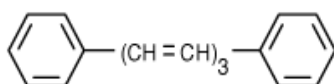


Spaghetti

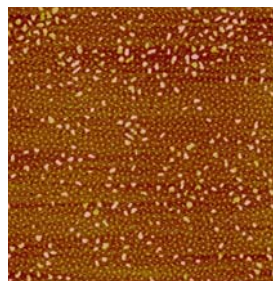


Dots

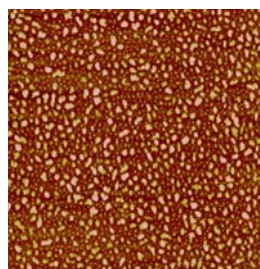
## 1,6-diphenyl-1,3,5-hexatriene (DPH)



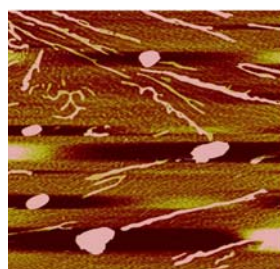
0:1 DPH:PS-PEO



1:1 DPH:PS-PEO



3:2 DPH:PS-PEO



2:1 DPH:PS-PEO

**Future Work.** The aggregation of dye to polymer may be temperature dependent. Testing the blends at a high and low temperature could increase aggregation at lower ratios of dye to polymer. Other hydrophobic dyes could also be investigated to see if a non-rigid carbon backbone increases aggregation or changes the structures formed.

**Results.** Blending in 1,6-diphenyl-1,3,5-hexatriene to a 34.6% PEO solution yielded larger dots with increasing frequency as the ratio of dye to polymer increased. At extremely large ratios of dye to polymer other structures such as spaghetti were produced.

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