Engineering GENTOO (Green Emulsion Nullification Through Oleophilic Objects) - A Device for Efficient Oil Spill Emulsion Remediation

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One of the most dangerous components of an oil spill is the emulsion that forms between the spilled oil and the surrounding seawater. This submerged emulsion can persist for many years and is difficult to remove. By separating that oil emulsion, the oil spill itself can be remediated more effectively. The design goal of this project was to develop a prototype for emulsion separation that decreased emulsion separation time by at least 20%. I based my designed in previous findings, namely, the efficacy of extremely polar and non-polar plastics in emulsion separation, and the efficacy of highly branch plastics. I ran both a Surface Effects Test to understand the various effects of different surface textures, and a Spacing Test to determine the proper spacing for combining polar and non-polar materials. By combining polar and non-polar plastics into “jellyfish”-like shapes I was able to exceed my design goal, creating a prototype that decreased overall emulsion stability by 25%, and decreased the time for the emulsion to begin visually separating by 86%. This prototype worked because of the increase in nucleation sites, points for the water and oil particles to begin agglomerating. In the future I plan to continue designing these prototypes and improving them to increase their separation by using plastics of increased polarity and adding more nucleation sites.

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