Aquadynamic Coating

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The shipping industry is enormous and is responsible for 90% of transport worldwide, however the carbon emissions only equivalate to around 3%. Even so the efficiency of the industry can still be improved. The hull of a ship is typically coated with several layers of different coatings, for protection and prolonged maintenance. The outermost layer is known as the topcoat and mainly serves the purpose of anti-fouling. The current solution to minimize fouling involves poisoning the environment around the ship, which is effective for a limited time and harms marine life and ecosystems severely. My project proposes an alternative solution: an anti-fouling ship paint that repels marine life without harming the environment as severely. By incorporating heavy metals into the paint in a safe and controlled manner, we can repel organisms and prevent fouling. The new method is based on self-activation instead of diffusion. The current method works by letting free ions from the paint diffuse into the water and thereby create a toxic cloud around the ship, however when all the ions have diluted into the water and are no longer bound to the ship, it remains defenseless against the 4000 different types of organisms that may attach. I propose treating the metals before they are incorporated into the paint for them to have a different type of release. By carbonating the ions, mostly copper, they will not be diluted into the water but remain in the coating, until a ph change will occur. When marine life, mainly barnacles and other crustaceans, try to attach to the hull their adhesive will be a different acidity and cause a release, thus making the coating self-activating.

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