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Poly(2-(3-(Amino)propyl)-2-Oxazoline) Graphene Oxide Supported: Go-pAmOx, a Route Towards Water Remediation From Organic Pollutants

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Organic wastewater compounds (OWCs) employed in human activities are, nowadays, commonly detected in surface water, groundwater and drinking water. In particular, pharmaceuticals have caused great concern because, after their consumption, traces or metabolites are excreted and reach the water resources either directly or after inefficient treatment. Considering the necessity to find new efficient, reusable and biocompatible systems to remove organic pollutants from wastewater, the adsorption process has been found to be the most effective and economical; because it is simple, highly efficient, regenerative, scalable and doesn't produce intermediates that can increase the toxicity of the parent contaminants. Prompted by these reasons, an adsorbed medium composed of graphene oxide (GO) and an amine-2-oxazoline-based polymer (pAmOx) was synthesized and employed in several adsorption experiments targeting non-steroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen, aspirin, ketoprofen, and benzoic acid. The specific interaction between acidic moieties of the drugs and basic domains of the polymer, has been investigated by targeting both acid compounds and pharmaceutical products free of carboxylic groups. The prepared GO-pAmOx shows a better adsorption efficiency compared to solely GO for acidic pharmaceuticals, and a lower adsorption for other drugs demonstrating the selectivity, ensured by the acid-base interaction. Other investigations concern the concentration of the drugs, the pH effect on the adsorption process, and the reusability of the material. These findings suggest that the prepared GO-pAmOx material has significant potential for adsorbing acidic pharmaceuticals in water, a good versatility for all investigated acid compounds, and maintains high reusability.

Biography:

I'm a PhD student in Material Science and Nanomaterials at "Roma Tre" University, specializing in the synthesis of polyoxazoline-based nanomaterials for removing organic compounds and metal ions from water. I hold an MSc in Analytical chemistry from "La Sapienza" University, where I graduated cum laude. During my PhD, I focused on synthesizing poly(2-oxazoline)s capable of interacting with pollutants detected in wastewater, realizing also composite materials with Graphene oxide (GO) and lignocellulosic substrates. My research combines material science and biocompatible polymer synthesis with the aim of remediate wastewater.