ACS Local Section Pittsburgh

Environmental Lectures

Microplastic Pollution, Not Just an Issue for Marine Organisms

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Abstract: Over the last 70 years plastics have become integral to modern society. Their manufacture and loss to the environment are increasing. Plastic composition and properties vary widely. Hence treatment as a homogeneous class of pollutants is problematic. Microplastics are defined as particles <5 mm; those <1 um as nanoplastics. Both derive mostly from degradation products of larger plastics. Their fate is affected by their chemical composition and surrounding environment. While microplastics in the oceans have received much attention, it is increasingly recognized that other environments are contaminated to varying degrees. Indeed, most plastic debris originates in the terrestrial "built" environment and can then be transported to other systems. The characteristics of plastic debris (e.g., shape, size, chemical composition (polymer and additive content) can be modified over time and space. These influence their fate and toxicological consequences. Analytical methods to detect microplastics are evolving but presently are inadequate. Therefore, most concentration estimates in environmental samples are incorrect. Human health impacts may be driven not just what we consume via water and food, but also by our personal environment (e.g., we spend >90% of our lives indoors). Microplastic (and associated chemical additive) effects may be affected by coincident stressors such as infectious agents.

Bio: Dr. Rob Hale is a Professor at VIMS, W&M. Prior to arriving there in 1987, he served for 3 years as a Research Env. Chemist at the Mobil Corporate Environ. Health Sciences Lab (Princeton, NJ). He received a PhD from W&M (1983) and a BS in Biology and BA in Chemistry from Wayne State U. (1979). His research interests include the sources, fate and effects of organic pollutants and microplastics in diverse environments (including marine, freshwater, terrestrial and built systems). He has published approximately 110 articles and book chapters. These have received about 11,000 citations. He was recognized with a W&M Plumeri Award for Faculty Excellence (2019), W. Taylor Reveley Interdisciplinary Faculty Fellowship (2019-2021), and Exceptional Reviewer Awards from J. Environ.Toxicol. Chem. (2013) and Environ. Sci. Technol. (2009). He lives near Williamsburg, VA with his wife Karen, 10 horses, 10 llamas, 3 dogs, 2 cats and 2 rescued green Macaw parrots..

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