
Plastics: Boon or Bane?

OSHER 319-001

Dates: Thursdays: January 14 – February 18

Time: 11:30 am – 1:00 pm

Location: Online via Zoom

Instructor: Alan Eastman

One Paragraph:

This class will discuss what ‘plastics’ really are – polymers in a variety of forms, ubiquitous in our lives – where they come from, how they are used, and where they go. We’ll start with enough chemistry (don’t worry, we’ll keep it pretty basic and, like all Osher classes, there are no exams!) to understand why just a few starting materials can give a bewildering array of products with different properties and uses. We’ll look at the ways the raw materials are made into finished products ranging from rubber duckies to dental fillings to molded kayaks to plastic wrap to airplane wings. We’ll also look at the entire plastics life cycle, from natural gas (the most common starting material) to recycle, landfill, or pollutant. Finally, we’ll discuss the problems of plastics packaging pollution of the world’s oceans, along with what we can do to help things change for the better.

By session – *note that this is still pretty tentative, as I’m not finished with putting all of this together! Moreover, since I have not yet taught the class, I’m not entirely sure what directions the questions from class members will take us.*

1. Introduction and basics – Where plastics come from, and the polymer family tree. Volume of plastics produced and main uses. The main classes of polymers (elastomers, thermosets, thermoplastics), the two main polymerization mechanisms (addition and condensation), how structure and properties are related.

Sessions 2, 3, 4, and 5, all kind of mixed together

- Elastomers – rubber of all varieties, plastics additives
 - Thermosets – The effects of cross-linking, silicones, bakelite, and so on, more additives
 - Thermoplastics – Molded articles, films, fibers, engineering plastics, composites
 - Processing – molding strategies (casting, blow molding rotomolding, etc.), making films, making fibers, and so on
6. Pollution and recycling – Why so few plastics are recycled, where the problems are, and what we can do about them.