

Homework 9

Plastics in a Circular Economy

This week we finished recycling in the automotive industry and covered electrical and electronic waste recycling (WEEE).

- a) ASR (automotive shredder residue) is often used as a feed for pyrolysis or other chemical conversion. Explain the two processes shown on the following webpage:
https://www.eep.ebara.com/en/business_technology/technology_3.html
Comment on the commercial viability of these processes compared to landfill without government regulation requiring their use.
- b) Compare the cradle-to-cradle life cycle (i.e. circularity potential) of an ICE and an EV car. Which is a more amenable to a circular economy?
- c) What are brominated flame retardants and antimony trioxide? What are the health hazards associated with these additives? How do they impact the WEEE recycle stream? How can this problem be addressed?
- d) What component of WEEE has the greatest commercial potential? How is this commercial potential currently being taken advantage of? Comment on the illegal flow of WEEE.
- e) What are the uses of non-metallic components of the WEEE recycle stream? What fraction of this stream do NMC occupy? Is this an important problem relative to the other components (i.e. toxicity, potential usefulness, possibility of improvement in circularity).