Fine Chemicals vs. Specialty chemical

* **Most of the bulk chemicals are based on specifications**
* **Fine chemicals are sold based on specifications**
* **Specialty chemicals are based on functionality**
* **Costs are higher for specialty chemicals than for fine chemicals.**
* **One of the challenges for fine chemicals is Waste Management**
* **E-factor = kg waste produced/kg product produced**
* **For Fine chemicals we have multipurpose/multiproduct plants**
* **But they are not efficient, cost is more**
* **For multiproduct plants, we need to have flexibility**
* **One such flexibility is Structural flexibility**
* **We could easily reconfigure equipments if we want to have different reaction**
* **Second one is Product assortment process variety of chemicals**
* **Third one is capacity flexibility**
* **Waste generation**
* **Atom efficiency: MW(C)/MW(C)+MW(D)**
* **A+B->C+D Do not consider water**
* **If we use heterogeneous catalyst**
* **Atom efficiency can be close to 1**

Selection of reactors for multipurpose plants

* **One of the main difference between bulk chemicals and fine chemicals is that the reaction mixture is in liquid phase for fine chemicals**
* **If we have a gas liquid system, transfer of gas to liquid can be very challenging**
* **Mixing is not uniform**
* **One option is sparging**
* **Multiple outlets for gas**
* **One alternative is hollow impeller**
* **Gas-liquid-solid: E.g.Hydrotreating**
* **We use slurry columns where solid is suspended in liquid and gas is bubbled through it.**