BME341 Biomaterials

Lecture #2
Types of Biomaterials

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Types of Biomaterials

- Biomaterials are classified in 3 categories
  - Metals
  - Ceramics
  - Polymers

Metals

- Metals are inorganic materials possessing non-directional metallic bonds with highly mobile electrons
- Metals are suitable for orthopedic applications, dental fillings, cardiovascular applications

Ceramics

- Ceramics are inorganic materials composed of non-directional ionic bonds between electron-donating and electron-accepting elements.
- Ceramics are generally used in bone and dental-related applications due to their compositional similarity

Polymers

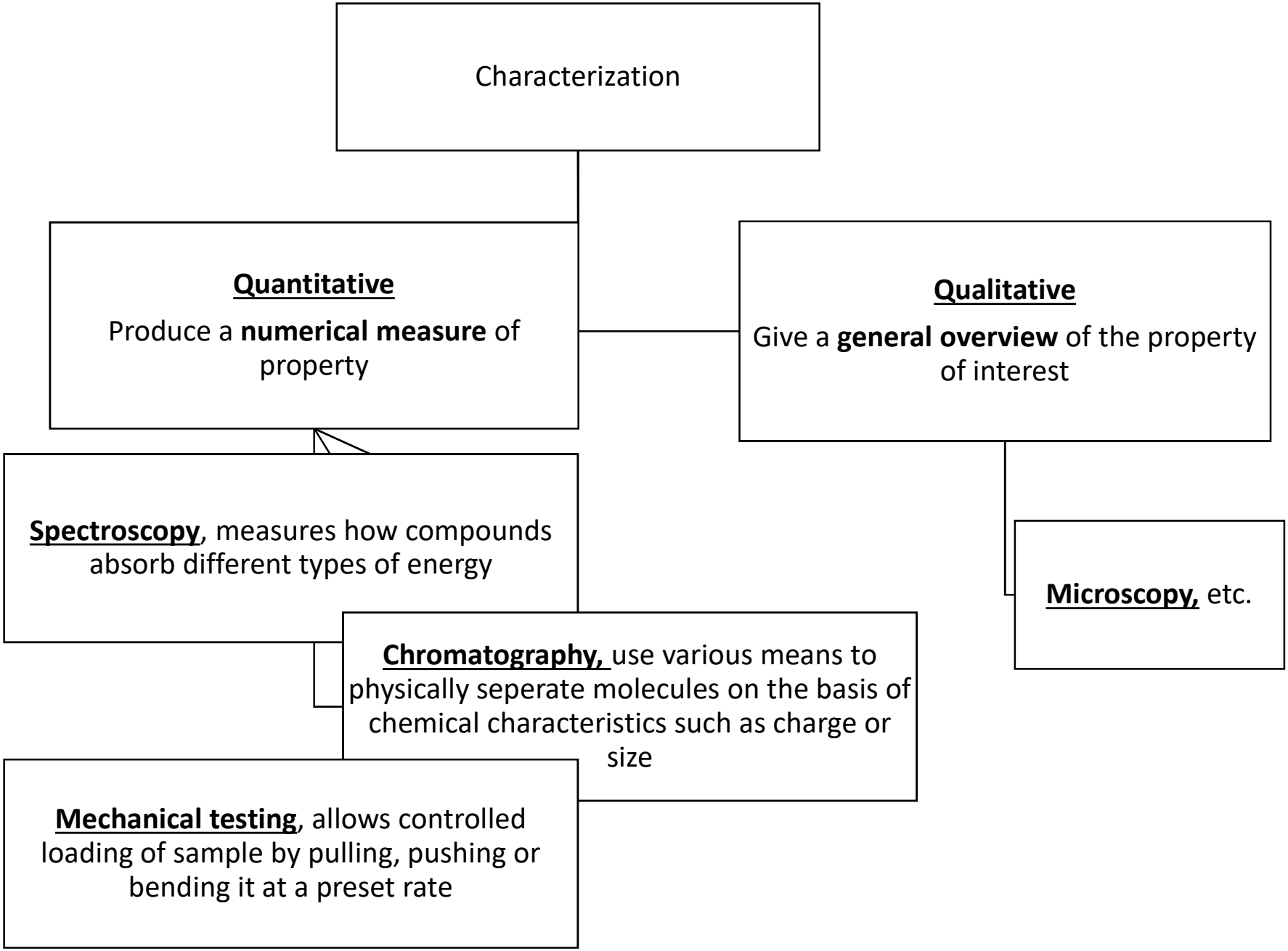
- Polymers are organic materials possessing long chains that are held together by directional covalent bonds.
- Polymers are widely used in biomedical applications due to the range of physical and chemical properties possible with these materials.

Important Properties of Biomaterials

- The selection of the biomaterial and appropriate processing techniques for a given application is determined by
  - Degradative
  - Surface
  - Bulk properties of the material

Characterization Techniques

- It is important to measure the bulk and surface properties of biomaterials appropriately since they affect the overall success of the application.


Characterization
Quantitative
Produce a numerical measure of property
Qualitative
Give a general overview of the property of interest
Spectroscopy, measures how compounds absorb different types of energy
Microscopy, etc.
Chromatography, use various means to physically seperate molecules on the basis of chemical characteristics such as charge or size
Mechanical testing, allows controlled loading of sample by pulling, pushing or bending it at a preset rate