X-Ray Production: Recipe for X-Rays

Objectives:

1.1 Describe the sequence of events while creating an image.

1.4 Describe how x-rays are produced.

MRT Program

Ingredients…

- 1. Source of electrons
  - 2. Means to accelerate the electrons
  - 3. Means to decelerate the electrons (Target)
- 4. Tube Voltage
- 5. Vacuum

Where do we get the ingredients?

- Source of Electrons
  - Heated filament
    - Releases the negative electrons
- Means to accelerate the electrons
  - Positive Anode
    - Potential difference
    - Attracts electrons

Where do we get the ingredients?

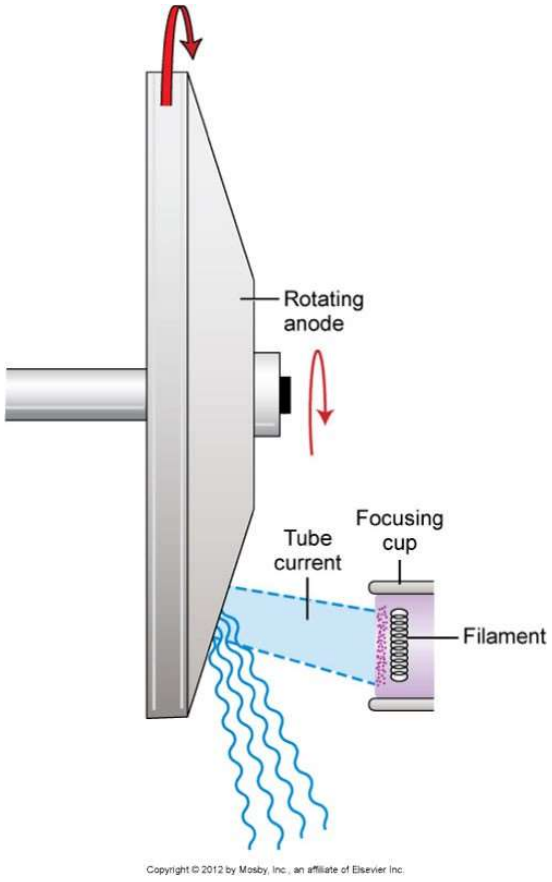
- Target to decelerate the electrons
  - Anode
  - Tungsten target to slow the electrons
- Tube Voltage
  - Power supplied by the generator
- Vacuum
  - All of the action occurs in the glass envelope

Directions

- Electrons gather in a thermionic cloud at the cathode
- Incident electrons from the thermionic cloud accelerate to the anode
  - Aka projectile or high speed electrons
- As they collide with the target (rotating at high speed), they are slowed down
  - Several types of interactions occur:
    - Production of heat
    - Production of radiation

Recipe Yields:

- 99% Heat
- 1% X-ray Photons



Copyright © 2012 by Mosby, Inc., an affiliate of Elsevier Inc.