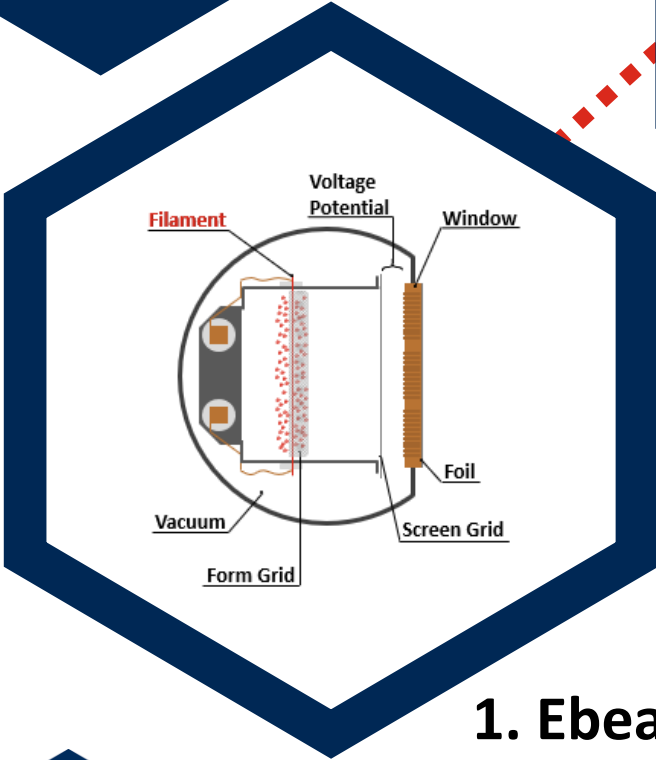


Introduction to Ebeam

4.13.21

Outline



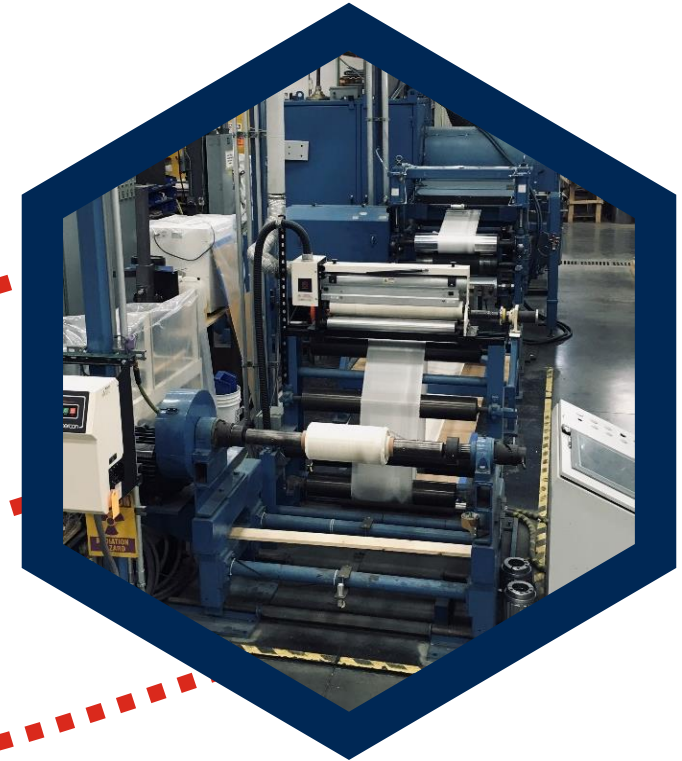
1. Ebeam Basics



2. Ebeam Application Benefits



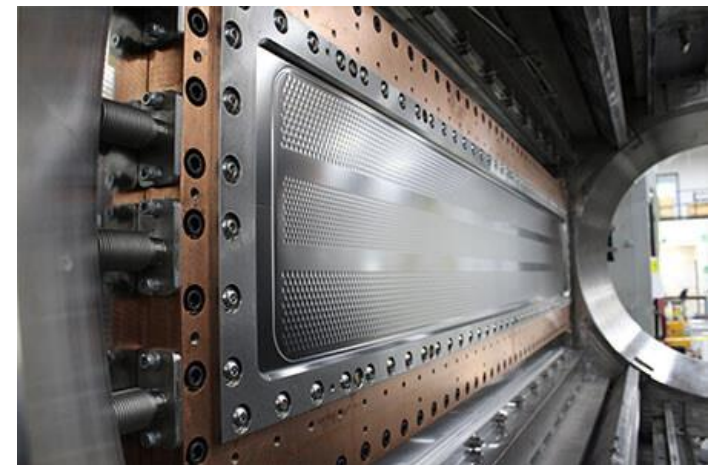
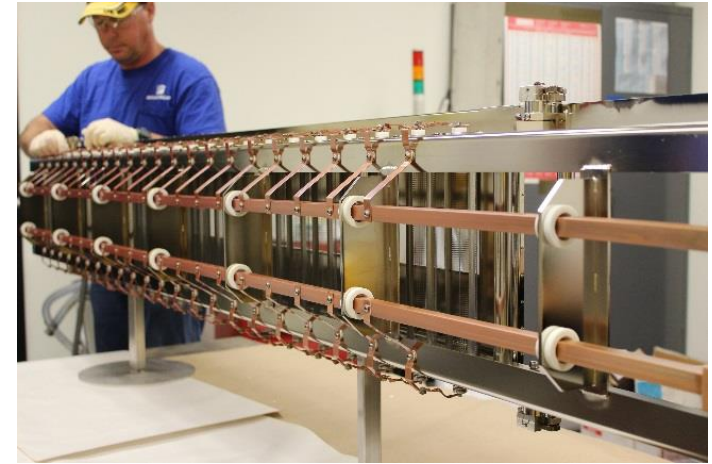
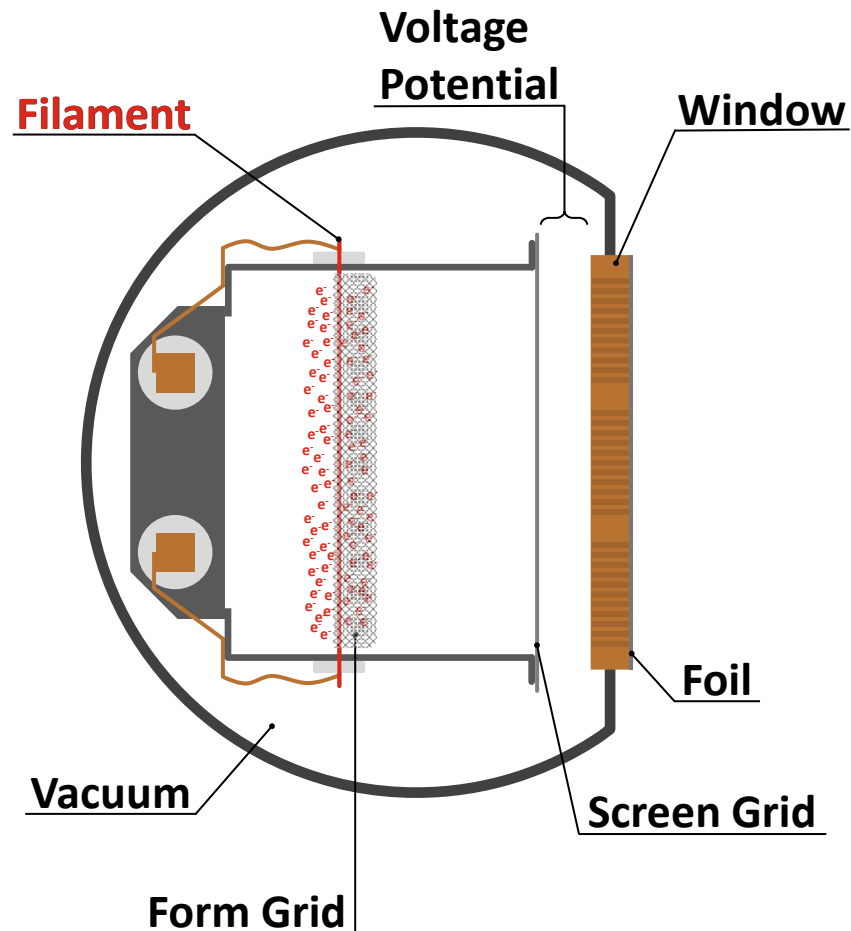
3. Equipment Design



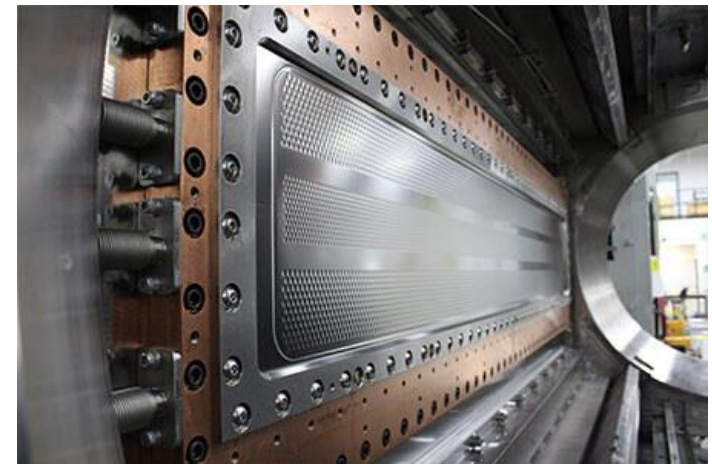
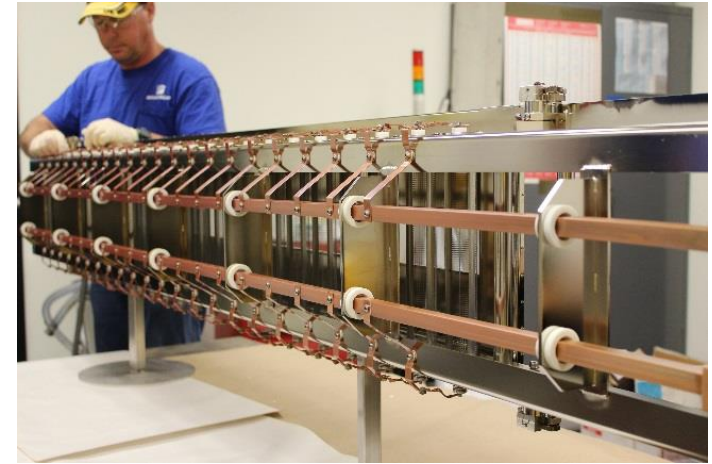
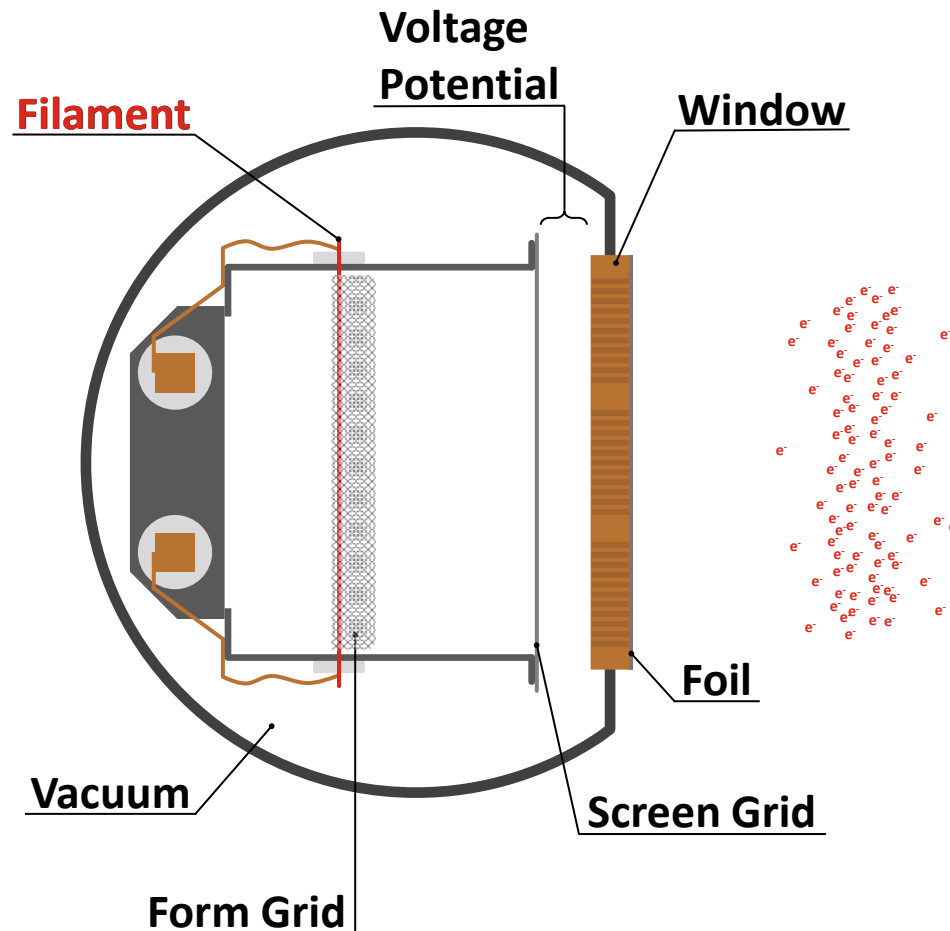
4. Application Development



An electron beam produces a curtain of accelerated electrons.

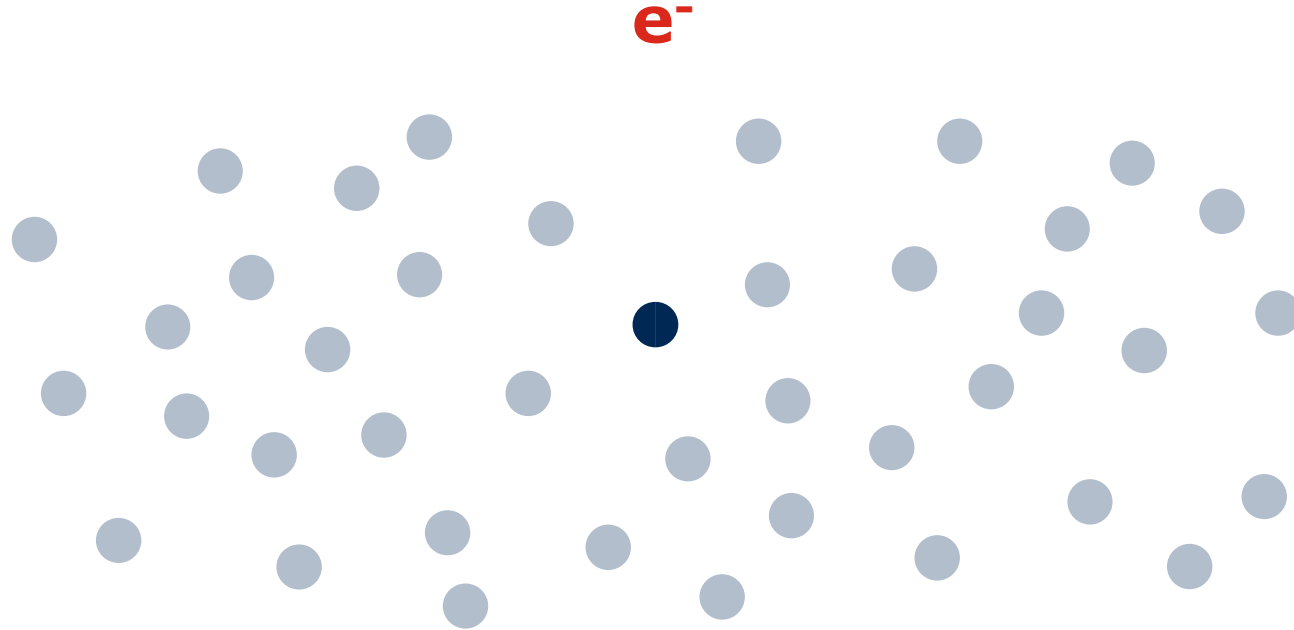


An electron beam produces a curtain of accelerated electrons.



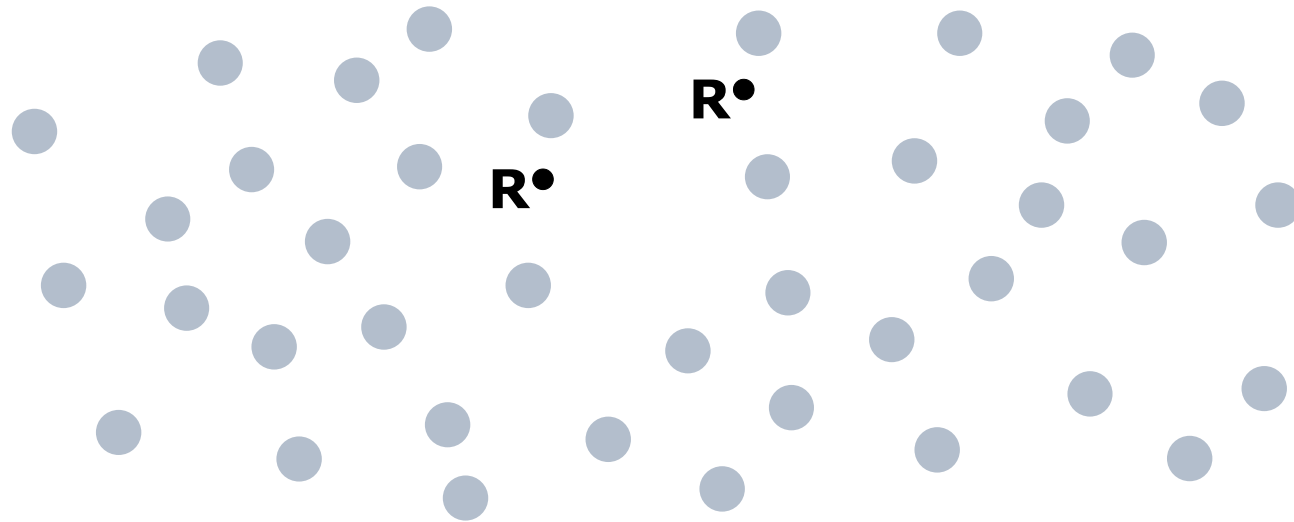
Ebeam uses accelerated electrons to break chemical bonds and initiate chemical reactions.

Ionization: $M \xrightarrow{e^-} 2R^\cdot$

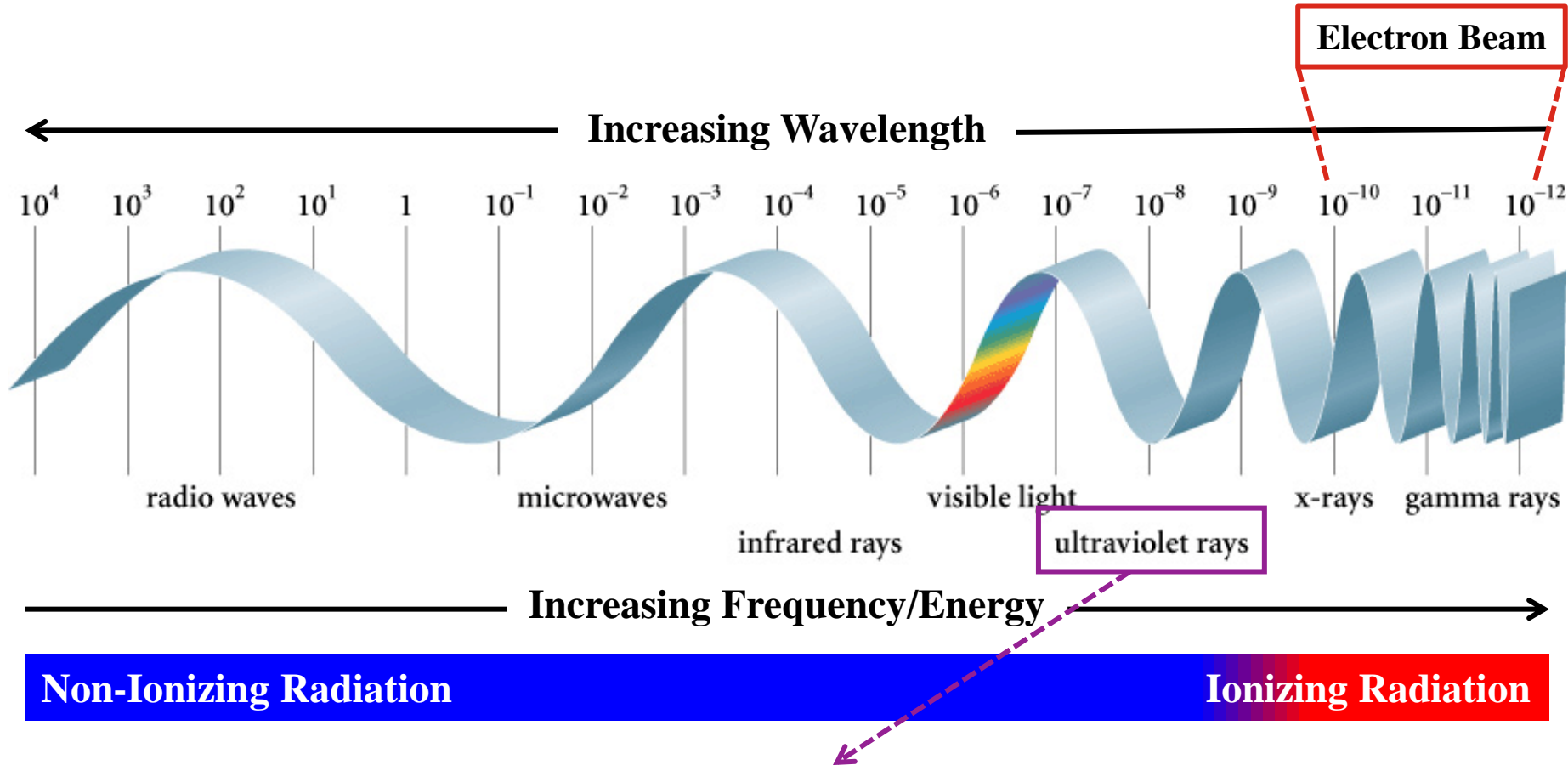


Ebeam uses accelerated electrons to break chemical bonds and initiate chemical reactions.

Ionization: $M \xrightarrow{e^-} 2R^\bullet$



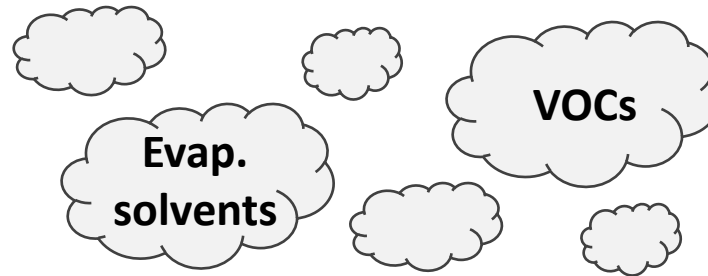
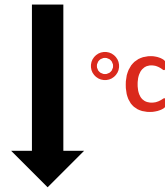
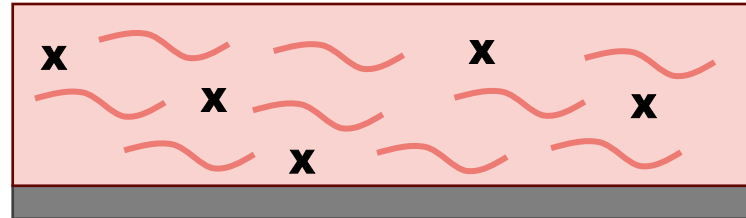
Unlike ebeam, UV is largely non-ionizing radiation and requires a photoinitiator to initiate cure.



Conventional
thermal-
drying
coating
release VOCs,
where EB-
curable
coatings do
not.

Thermal-drying Coatings

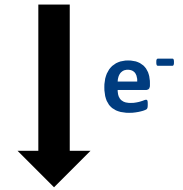
Polymer, crosslinker (hardener),
and solvent



Crosslinked coating

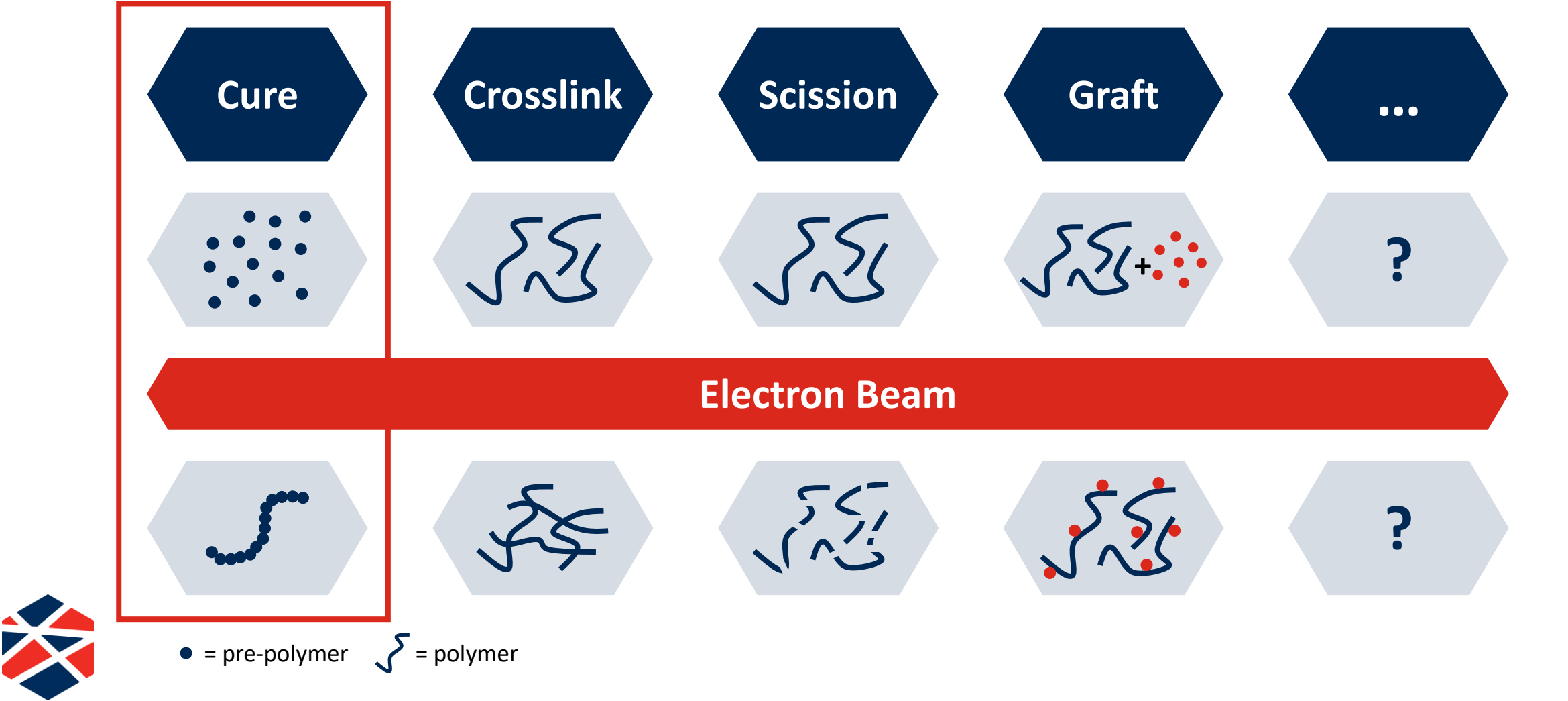
EB-curable Coatings

Pre-polymer (monomer & oligomer)



Crosslinked coating

Ebeam uses accelerated electrons to break chemical bonds and initiate chemical reactions.



The effects of ebeam can be applied to numerous applications.



Flexible Food Packaging



Interior/Exterior Architectural Products



Paperboard Packaging



Pressure-sensitive Adhesives



Tires



Coil Coating



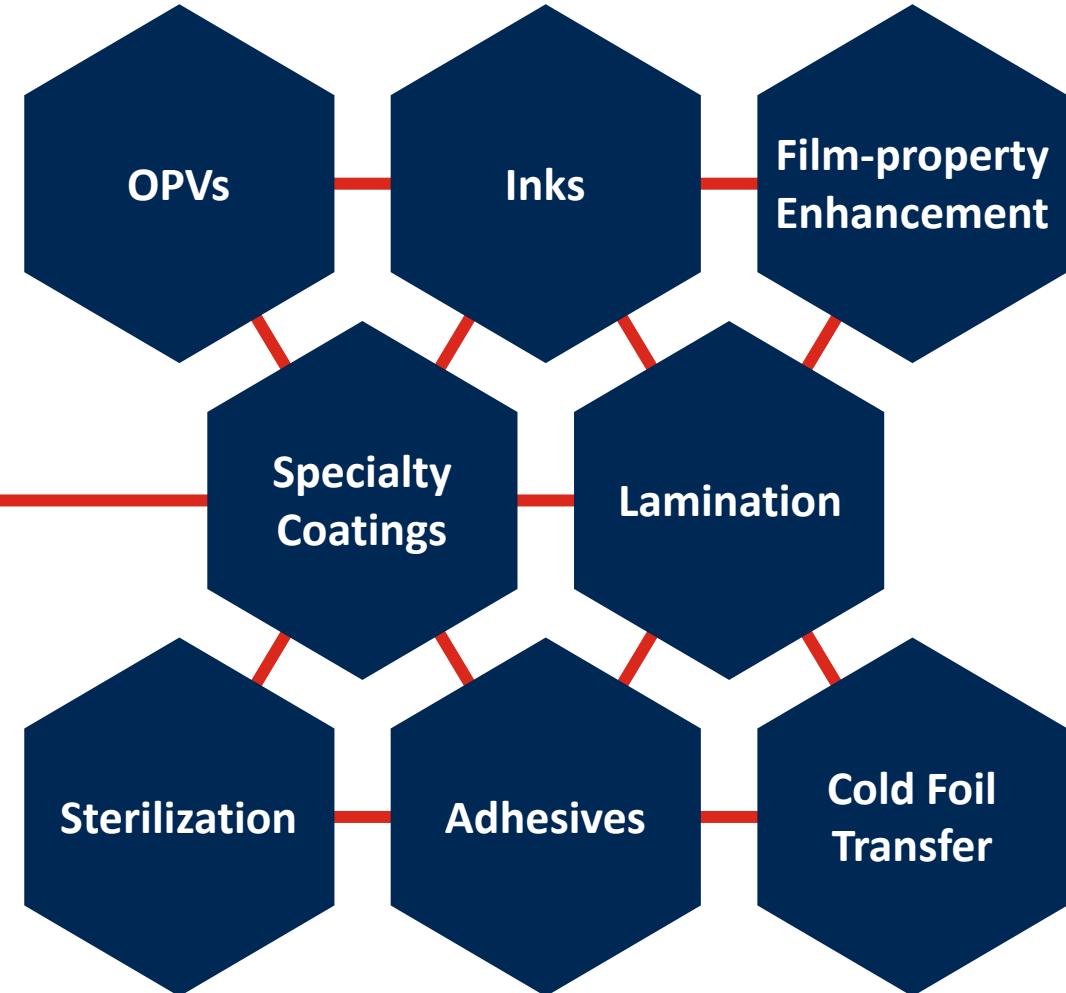
Sterilization and Disinfestation



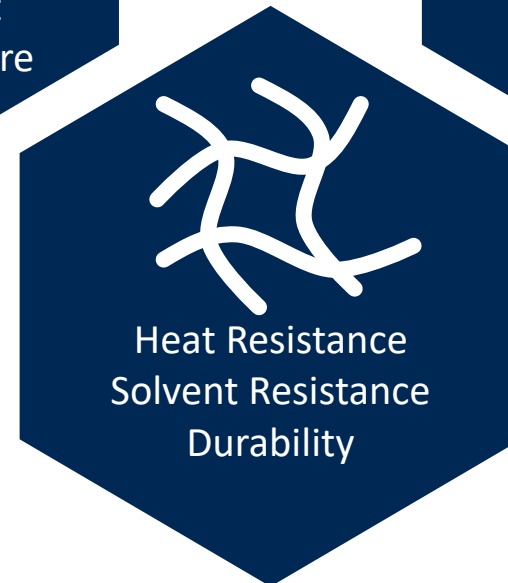
Heat Shrinkable Films and Sleeves



In an individual application, ebeam can be used to achieve numerous effects.



Ebeam technology has many benefits compared with other methods.



PCT offers four different families of low-energy electron beams to accommodate customers' needs.

INVICTUS



OMNIA



CORE



DYNAMIC



Energy

80 – 300 kV

80 – 150 kV

80 – 100 kV

80 – 200 kV

Width

1140 – 2290 mm

915 – 2743 mm

760 mm

200 or 400 mm

Speed

400 mpm

400 mpm

180 mpm

100 mpm



With ebeam...

- ◆ Scalable design for wide webs
- ◆ Uniform dose
- ◆ Compatibility with multiple substrates
 - ◆ Plastic film
 - ◆ Paper
 - ◆ Paperboard
 - ◆ Metal foil



What benefits does PCT's patented, integrated shield roll provide users?

- ◆ Web control, stability, and access
- ◆ Access to the foil/window for maintenance
- ◆ Reduced nitrogen consumption
- ◆ Heat reduction for temperature sensitive substrates



Ebeam produces x-ray radiation; how is it safe?



Self-shielded: **certified** not to exceed 0.1 mrem at 10 cm (4 in) from any surface.



Automatic safety interlocks on every beam.



Free of a radioactive source; no radiation is present when the beam is off.



Electrons **don't** make material radioactive.



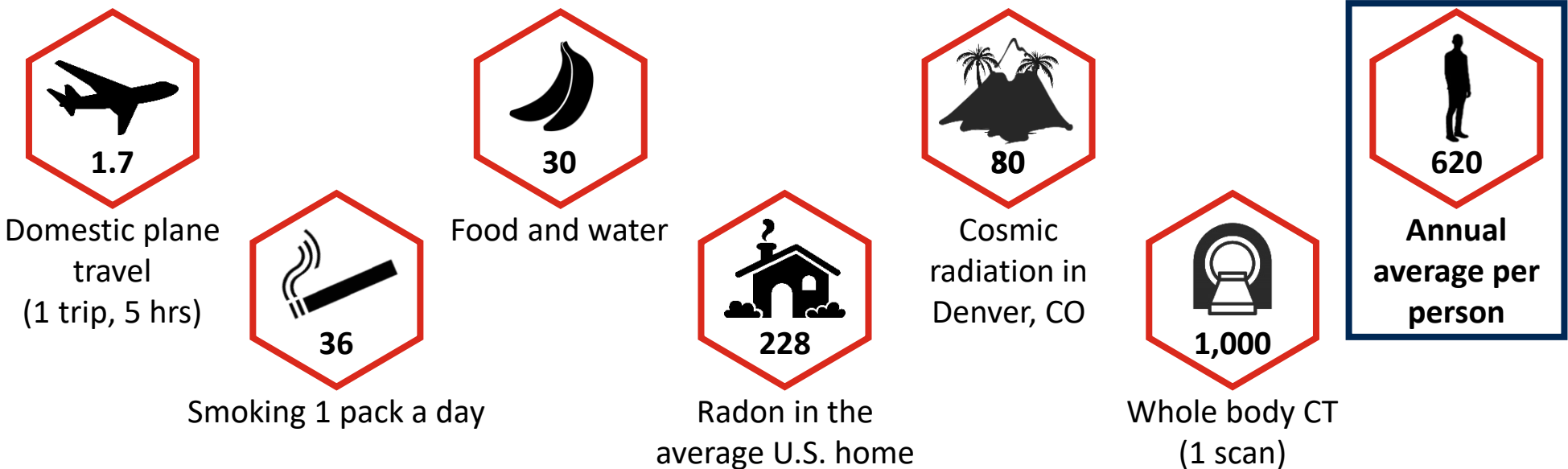
Ebeam produces x-ray radiation; how is it safe?



Self-shielded: certified not to exceed 0.1 mrem at 10 cm (4 in) from any surface.

VS.

Average Annual Dose from Common Sources (mrem)



Our pilot line allows customers the ability to realize the advantages of ebeam in their process through testing.

- ◆ Proof-of-concept to toll work
- ◆ Adaptable to custom configurations
- ◆ Indirect gravure coater with corona treater
- ◆ 26 inches (660 mm) wide, voltages up to 300 kV
- ◆ Optional fiberglass web for sheet samples



Summary

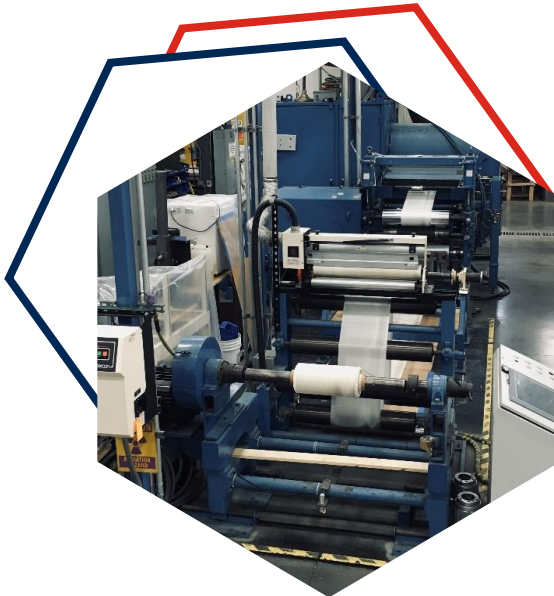


Ebeam technology produces sustainable, high performance products without the use of solvents.

Ebeam designs are customizable to a variety of substrates, widths, and product types to suit customer needs.



PCT can assist with application development.



Que^estions?

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President

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