

Quiz

1. Which of the following best describes photons compared to phonons?

- A) Low energy, large momentum
- B) High energy, small momentum
- C) High energy, large momentum
- D) Low energy, small momentum

2. Why is radiative recombination unlikely in silicon?

- A) Silicon has a wide bandgap
- B) Silicon has an indirect bandgap, requiring a phonon for momentum conservation
- C) Silicon lacks traps in the bandgap
- D) Photons in silicon cannot carry enough energy

3. How does Auger recombination rate scale with carrier concentration?

- A) Linearly with n or p
- B) Quadratically with n or p
- C) Cubically with carrier concentration
- D) Independent of carrier concentration

4. In n-type Si, why do mid-gap traps communicate more effectively with the conduction band than the valence band?

- A) The conduction band is closer in energy to the trap level
- B) Most traps are empty in n-type Si
- C) There are many more electrons available in the conduction band
- D) Traps do not interact with the valence band

5. Which recombination mechanisms dominate in silicon under typical conditions?

- A) Radiative and Impact ionization
- B) Trap-assisted and Auger
- C) Thermal and Tunneling
- D) Optical and Zener tunneling