

2013 Qual Exam Questions

Prof. H.-S. Philip Wong

I would like to have a solid-state imaging device that takes a picture of the room in the visible wavelengths, in color.

You are given the following materials and the use of a semiconductor fabrication facility: Si, Ge, SiO₂, Si₃N₄, TiO₂, HfO₂, Al₂O₃, Al, Cu, W.

Would you please make a proposal for such a COLOR solid-state imaging device using only those materials listed above? Trace elements such as dopants of semiconductors can be assumed to be available.

Please explain the physics and the operation principles of the proposed device.