

Photoluminescence on Room-temperature Germanium-Tin (GeSn)

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The use of silicon (Si) in the optics and photonics industry is very popular due to its electronic properties and compatibility with CMOS technology, as well as other semiconductor devices. Germanium (Ge) is an alternative material that can be grown on Si substrates and is now used in photonic devices. However, both Ge and Si suffer from non-radiative processes due to being indirect band-gap materials. Unlike Si, Ge is a quasi-direct bandgap semiconductor and can be band engineered through strain or Sn alloying. Similar to Ge, germanium-tin (GeSn) has shown potential in the photonics industry with a greater focus on light sources.

Photoluminescence spectroscopy was carried out using a NIR 980nm laser to probe the optical properties of the GeSn/Ge/Si samples. These measurements were analyzed with reference to Rutherford backscattering and cross-sectional TEM.