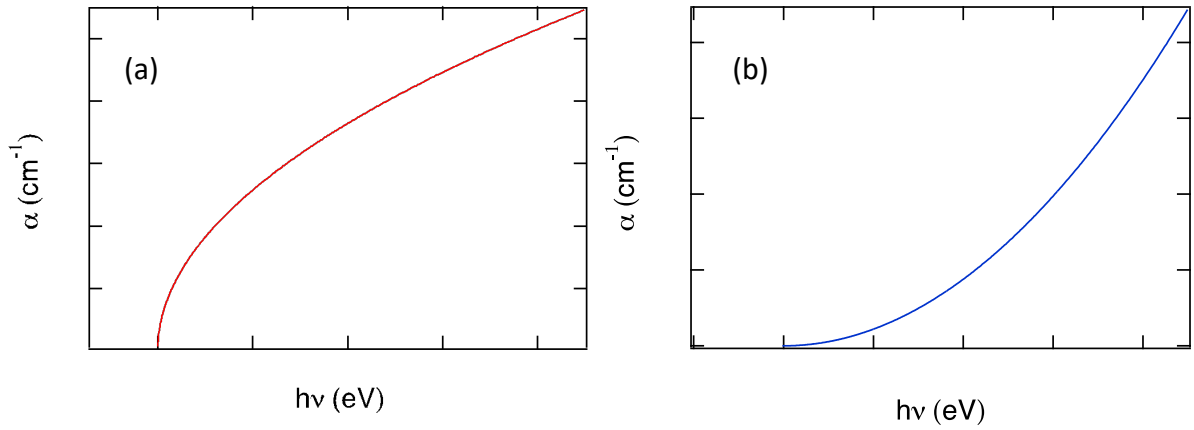
Exercice 8.1: Direct or indirect bandgap

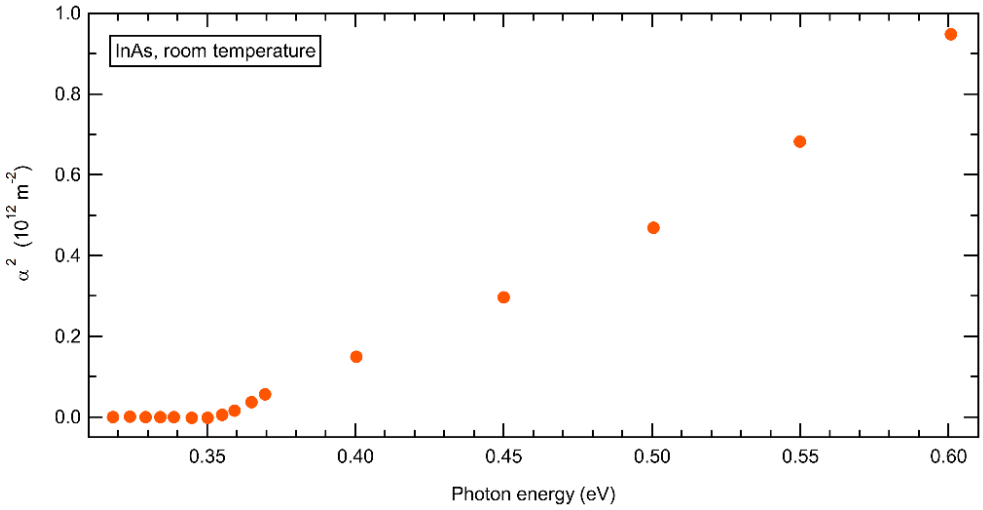


1) The absorption coefficient has been plotted as a function of frequency for two different semiconductors. Explain what type of semiconductor is associated to each of these graphs.

2) How would these graphs evolve with temperature?

Exercice 8.2: Bandgap determination

In the figure below is plotted the absorption coefficient as a function of the photon energy for InAs. Based on this plot, is the semiconductor direct or indirect? Determine its bandgap.



Exercice 8.3: Transmission of a sample

Indium phosphide is a direct gap III–V semiconductor with a band gap of 1.35 eV at room temperature. The absorption coefficient at 775 nm is 3.5×10^6 m $^{-1}$. A platelet sample 1 µm-thick is made with anti-reflection coated surfaces. Estimate the transmission of the sample at 620 nm.