



Figure 8.28 Intensity of (a) Si (111) and (b) Si (220) peaks in the XRD spectra of processed samples as functions of processing temperature. A “jump” of peak intensity around 490°C can be observed for the 10- μm -thick sample

becomes much stronger at temperatures close to 450°C. By controlling the process conditions, it is possible to confine Al to the vicinity of the Si–Al interface, leaving the crystallized film (away from the interface) with a low Al concentration. In contrast, thermally crystallized films have nearly uniform and high concentration of Al. Some films, thermally processed at higher temperatures, may exhibit lateral nonuniformities because of segregation into Si-rich and Al-rich phases.

The proposed explanation of the optically assisted, Al-induced crystallization and grain enhancement of thick samples is as follows:

- Optical processing generates a nonuniform temperature distribution within the film structure, especially at the Al–Si interface where energy can be locally absorbed, producing a higher temperature spike.
- In high-temperature (>450°C) optical processing, although the monitored film surface temperature is lower than the eutectic point of an Al–Si system, melting in the local