

Low Temperature Epitaxy in a Plasma Enhanced Chemical Vapor Deposition environment*

MBE and MOCVD are well established techniques for epitaxial growth. They mean a high growth temperature and/or an ultra-high vacuum environment. Thus, when asking the question: can we grow epitaxial silicon films at low temperature (~200 °C) in a PECVD environment? the most common answer is: no. Still, this is what researchers at LPICM have been convincingly doing over the past years. Starting with silicon homoepitaxy to produce flexible c-Si foils [1], they have moved to heteroepitaxy of Ge and SiGe on silicon [2,3] but also on GaAs substrates (as shown in the TEM image). While the structural quality of the epi-layers has been extensively qualified thanks to TEM, Raman and X-ray diffraction measurements, the electronic properties of these hydrogenated low temperature epi-layers have been also tested in heterojunction solar cells using the so-called wafer equivalent approach [4]. We are convinced that bringing the epitaxial growth to low cost deposition techniques opens exciting possibilities for high performance electronic devices (transistors, diodes, detectors, solar cells,...) on flexible substrates.

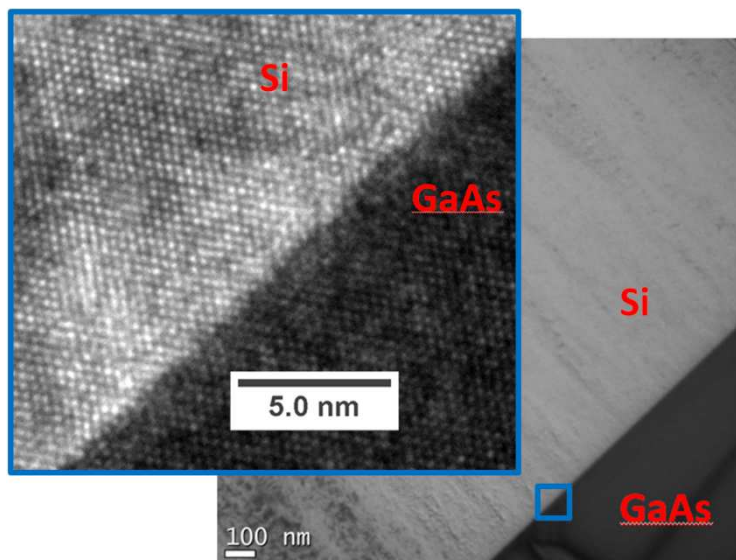


Photo courtesy of Jean-Luc Maurice.

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