

Invited talk to be presented by John Wendelken at the
**DOE-NSET Workshop on Artificially Structured Nanomaterials:
Formation and Properties**

Gatlinburg, TN, October 13-15, 2003

Buffer Layer Assisted Growth: When Only Nanoclusters Will Do

Conventional growth using molecular beam epitaxy has been a subject of study for many years. The growth process is kinetically limited and results in a wide array of non-equilibrium structures depending on growth rate, temperature, and most importantly, the materials comprising the substrate and the growing nanostructures. While these structures are interesting in themselves, techniques are needed that allow the growth of a chosen nanostructure type independent of the materials. For the growth of nanoclusters and quantum dots, such a capability is provided by the technique of buffer layer assisted growth. Here, the growth of any material A on substrate B is accomplished with an intermediate, temporary, frozen layer of xenon that promotes the clustering of atoms. Examples are given showing the utility of this technique to create structures having both scientific and practical interest.

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