
Materials Research Science and Engineering Center
(MRSEC)
Summer 2000 Team



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In-situ STM Studies of Metal/Semiconductor Interfaces

This study uses molecular beam epitaxy (MBE) to grow samples with GaAs/Sc_{1-x}Er_xAs/GaAs heterostructures. The growth of Sc_{1-x}Er_xAs on GaAs results in a layer by layer (Frank van der Merwe) growth mode, however, the growth of GaAs on Sc_{1-x}Er_xAs tends to result in 3-D island growth (Volmer-Weber). Initial growth of GaAs on the Sc_{1-x}Er_xAs layer exhibits layer by layer growth for coverages less than one monolayer. For coverages of GaAs in excess of one monolayer, the overlayer unwets the surface and exhibits 3-D island growth behavior. *In situ* scanning tunneling microscopy (STM) will be used to image the Sc_{1-x}Er_xAs surface structure and the initial nucleation of GaAs on the Sc_{1-x}Er_xAs surface. This will provide structural information about the preferred deposition sites and bonding at the interface. Additional GaAs growth and STM imaging will provide insight into the unwetting of the GaAs overlayer and the subsequent change from a layer by layer growth mode to a 3-D island growth mode.