Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

**Site-Selective Studies of Er-doped $SiO_2$/SRO layers** ZACKERY FLEISCHMAN, VOLKMAR DIEROLF, Physics, Lehigh University, YANLI ZHANG, MARVIN WHITE, ECE, Lehigh University — Er-doped $SiO_2$ has attracted much attention as a possible pathway to realizing Si-based optoelectronic devices. Of particular interest is how the presence of silicon nanocrystals affects the Er emission in this host material. In samples containing nanocrystals, there are three possible environments for the Er defect to occupy: within, near, and far from the nanocrystal silicon; each environment having the possibility for clustered and nonclustered Er. We present site-selective photoluminescence results obtained from samples with and without nanocrystals to analyze the spectral differences between these two types of samples. We can spectrally identify the different Er environments by directly comparing the results from the two types of samples. We observed Er clustering sites which become dominant as the activation anneal temperature increases. This Er clustering site emission is decreased in the samples containing nanocrystals, indicating that the excess silicon inhibits the formation of clusters. Despite our good site-selectivity, we were unable to find any special spectral signature of nanocrystal-related Er suggesting that their local environment is similar to that of isolated Er ions in $SiO_2$.

Zackery Fleischman
Physics, Lehigh University

Date submitted: 30 Nov 2005 Electronic form version 1.4