SAFC Hitech™ Enabling Technology

technical bulletin

Superior Performance from EpiPure™ TMA
No Oxygen Detected in AlAs/AlGaAs Layers

With the increasing number of applications requiring high Al content layers, in particular VCSELs, precursor purity has become the key factor in quality achievement. Specifically, oxygen contamination has been identified as of critical importance. New analysis technologies have been developed by SAFC Hitech to allow new production process optimisation to be performed yielding improved quality precursors.

Qualitative assessment of these source materials in the MOVPE process has demonstrated significant reductions in oxygen contamination levels and subsequent increases in device properties. Below are typical data obtained with EpiPure™ TMA at different customer sites that highlight the superior quality of this product and also batch to batch reproducibility.

Correlation of NMR and SIMS [O] data for $Al_xGa_{1-x}As$ Layers (Provided by IQE)

TMA Sample Number	O Level in TMA Using New NMR Technique	[O] in $Al_xGa_{1-x}As$ by SIMS (cm^{-3})		Composition
		p type (C) 3-5e18 cm^{-3}	n type (Si) 1-3e18 cm^{-3}	
Sample 1	>30 ppm	$1*10^{19}$	$8*10^{18}$	X=0.9
Sample 2	13 ppm	$1*10^{19}$	$2*10^{18}$	X=0.9
Sample 3	7.5 ppm	$1.5*10^{18}$	$6*10^{17}$	X=0.9
Sample 4	6.0 ppm	$6*10^{17}$	$1.5*10^{17}$	X=0.9
Sample 5	4.6 ppm	$1*10^{17}$	$1*10^{17}$	X=0.9
Sample 6	3.8 ppm	$2*10^{17}$	$4*10^{16}$	X=0.9
EpiPure™ TMA	<1 ppm (ND)	$<3*10^{16}$ (ND)	$<3*10^{16}$ (ND)	X=1

SIMS data provided by University of Texas at Austin for AlAs/AlGaAs structures and DBR