

XPS STUDY OF pHEMT STRUCTURE CLEANED USING HCl, HF AND BOE ETCHANTS

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ABSTRACT

Unetched and HCl, HF, BOE solutions (acid to water = 1:10 and 1:20) etched surface of GaAs top layer of GaAs based pHEMT samples were analyzed by XPS technique. It was found that the unetched sample consists of about 9-10% oxide (Ga-oxides and/or As-oxides) species whereas other etched samples consist of 5-8% oxide content. The optimum effect of removing oxide layer was shown by HCl: H₂O (1:10) treatment, where about 40% of oxides content reduction was achieved. At this concentration the XPS spectra of this sample also shows that (a) oxide contribution to O 1s peaks only come from As elements, (b) the treated surface is an As-rich surface. This is consistent with the decreasing value of Ga/As ratio before and after HCl treatment.

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